Business Screen

THE MAGAZINE OF COMMERCIAL AND EDUCATIONAL FILM

No 1 VICTORY TRAINING EDITION

VOLUME FOUR • 1942 • SINGLE COPY FIFTY CENTS

DeVRY'S IN THE ARMY TOO!

(Above) Official U. S. Army Photo

DeVry cameras help test America's new bombers: flight recorder equipment utilizing the DeVry Model A camera is a standard part of aircraft test equipment now being used by many leading plane manufacturers.

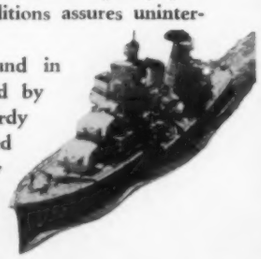
OVER 300 DeVRY 35MM. THEATRE SOUND PROJECTORS TO U. S. ARMY AIR CORPS!

In all branches of the nation's armed services, where films are today demonstrating their inestimable value for teaching as well as wholesome entertainment, DeVry craftsmanship is fulfilling the need for sturdy, dependable projection equipment essential to the success of this vital victory program. To the growing list of Government users of our sound projectors DeVry is proud to add the U. S. Army Air Corps, recent purchaser of more than 300 theatre sound projectors including DeVry sound systems.

U. S. NAVY SHIPS AND BASES ARE ALSO DeVRY EQUIPPED!

Hundreds of DeVry 35mm Sound Theatre Projectors and Sound Systems are being installed on fighting ships and at many of the far-flung shore bases of our Navy. Here, too, the same rugged construction and constant, theatre-quality performance under the most trying conditions assures uninterrupted programs whenever required.

The same craftsmanship is found in DeVry 16mm Sound Projectors used by schools, industry and Government. Sturdy and dependable, yet especially designed for convenient portability, this DeVry equipment assures the finest in 16mm performance.



AUDIO-VISUAL AIDS ESSENTIAL IN WAR TRAINING

The complex techniques of modern mechanized war and the swift expansion of our nation's armed forces have made audio-visual aids the teaching media of the hour. Speeding the training of millions of service men in the nation's drive to victory are the many hundreds of instructional film subjects produced by Army and Navy. On the industrial front, too, where apprentices must be rapidly trained to help meet the increasing demand for essential war production, vocational training films are playing an all-important role in shortening learning time. Wherever students, citizens, workers and the men of our armed services gather to learn by films, DeVry 16 and 35mm projection is "on duty" to assure unfailing quality in screen performance.

DAY and NIGHT for VICTORY

On night and day shifts, DeVry craftsmen maintain unceasing efforts to assure production of 16mm sound and silent projectors as well as DeVry 35mm equipment, for schools, industry and the U. S. Government.

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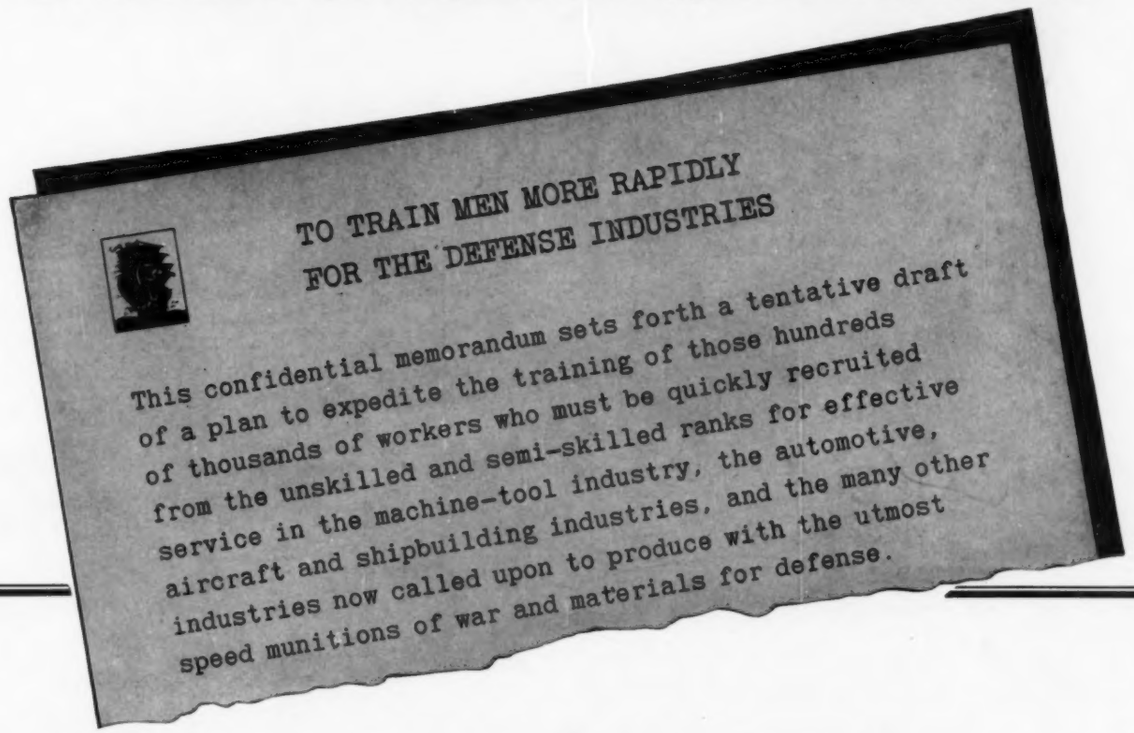
No Longer "Confidential"

So just as a matter of record, here is the opening paragraph of the original plan developed in collaboration with the U. S. Office of Education and approved July 15, 1940.


TO TRAIN MEN MORE RAPIDLY
FOR THE DEFENSE INDUSTRIES
This confidential memorandum sets forth a tentative draft of a plan to expedite the training of those hundreds of thousands of workers who must be quickly recruited from the unskilled and semi-skilled ranks for effective service in the machine-tool industry, the automotive, aircraft and shipbuilding industries, and the many other industries now called upon to produce with the utmost speed munitions of war and materials for defense.

"FILMS FOR DEFENSE" are now getting into action. We direct your attention to the following Caravel productions:

Five Films on the Milling Machine: The Milling Machine . . . Cutting Keyways . . . Straddle and Surface Milling to Close Tolerances . . . Straddle Milling . . . Plain Indexing and Cutting a Spur Gear.

Five Films on Shipbuilding: Preparing and Setting a Keel Block and Bottom Cradle . . . Innerbottom Sections: Sub-assembly of a Closed Floor, Sub-assembly of a Solid Floor . . . Side Frames: Sub-assembly of a Web Frame . . . Deck Girders: Sub-assembly . . . Deck Plates: Regulating and Setting.

TO BUSINESS MEN: The same organization that had the foresight and initiative to promote the use of training films in the defense industries eighteen months before this country was at war should be excellently equipped to serve you in creating training programs to speed immediate production, or to develop long-range selling plans. Ask to see our recent training films. Talk with our clients. Judge for yourself.

CARAVEL FILMS

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Symbolic of America's expanding aircraft industry and its need for skilled and semi-skilled workers is this scene showing Martin bombers from the O.E.M. Film Report "Bomber".

Visual Aids of Great Importance in Training Program for Workers in War Industries

BY Frank J. McSherry, *Chief, Defense Training Branch, Labor Division, Office of Production Management*

ALL TYPES of visual aids have a place in trade and industrial training. In addition to the projected image we thus make use of the printed or written word; the chart, drawing, diagram, illustration, or print; the model, or job itself. In visual aids of the projected image type, piece, part, or assembly; and the actual machine tool the photographic techniques have been developed to a high degree. Much remains to be done, however, in developing the best techniques and instructional processes for the presentation of correct shop methods as practiced by industry, and in utilizing training aids most effectively in imparting this instruction.

The development of courses of instruction should be placed in the hands of training experts who understand the application of the time-tested principles of trade and industrial education and who are working in the field for which training aids are being planned. This group with the assistance of specially selected mechanics, technicians, and foremen from the occupation itself should determine and select the content to be taught. This combined talent will insure correctness of method and arrangement for presentation in correct instructional order. New material will be presented "one thing at a time" in small amounts. Immediate application of the "check up" step, so important in trade and industrial training, will be provided for. The arrangement in the order of difficulty will be secured by going from the simple to the complex, from the easy to the difficult, and from the safe to the dangerous in procedures.

In the selection of essential operations, special consideration will be given the break-down under teaching points involving skills, techniques, and "shop kinks". Those techniques or methods that can be better shown by visual aids than by demonstration will be spotted. The best type or combination of types of visual education will be determined by such a group working with the skilled projection technicians.

Many training films are too long to permit retention of content. Movies and slide films should be short and shorn of all non-essentials, such as music and other fol-de-rol. Color is only advisable where it aids in visualization or differentiation. The application of these principles will save time, money, and effort and will insure an effective contribution to the all-important job of placing trained men on the production line.

TRAINING for VICTORY
...with Sound Motion Pictures

IN THE gigantic effort to weld this country into an effective fighting force—sound motion pictures are of tremendous importance. They play a vital role in training U. S. Army, Navy and Air Corps personnel . . . speeding up industrial production . . . training industrial workers . . . aiding in vocational education . . . making possible the more effective operation of government departments . . . providing morale-building entertainment to U. S. armed forces . . . and in disseminating important defense procedures to the general public. Ampro 16mm. silent and sound projectors, in ever-increasing numbers, are helping carry out this huge program.

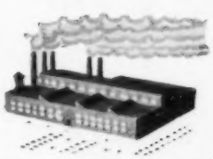
U. S. Navy Training

U. S. Army Training

Governmental Departments

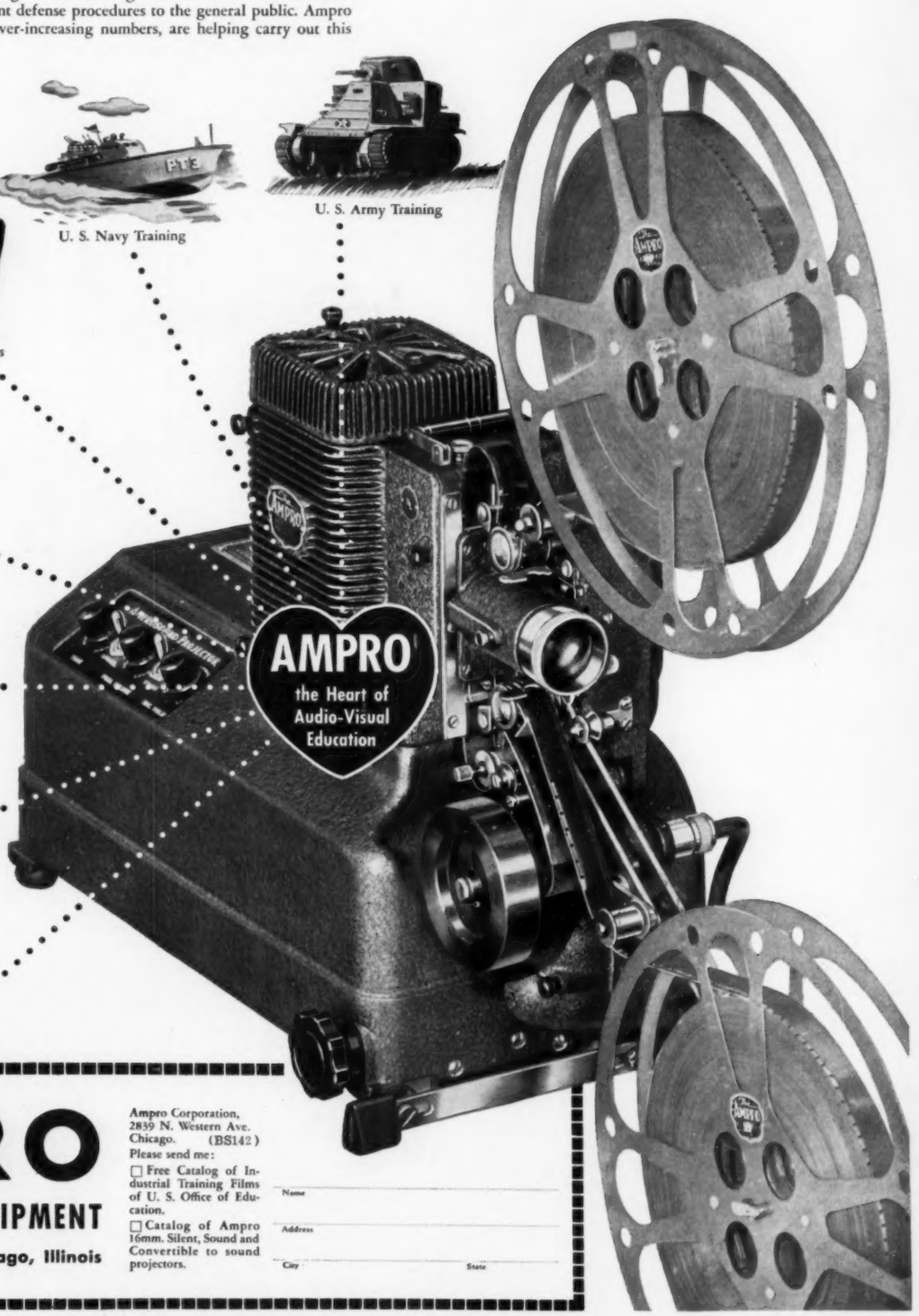
High Schools, Colleges

Army and Navy Air Corps



Industrial Training

Army Camp Programs



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1943

Washington, D. C.—Accurate data and information about films, equipment, and their uses by the Government agencies for vocational training and similar purposes, are practically impossible of assembly. One striking exception is the U. S. Office of Education which now is able to offer a definite film training program to all agencies of government concerned with vocational education in machine tools and shipbuilding skills.

The other two-thirds of the civilian defense industries will be in full swing within the next nine months and will be scattered over all parts of the United States, probably also in foreign areas, where there are United States armed forces, and where the civilians connected with Defense may carry the industrial help of the United States. Much of this vocational training will be spread, in the near future, through the 60 clients of the United States who receive lend-lease aid. These include China, the Dutch East Indies, the French, Belgians, and others, in Africa; and other groups elsewhere, such as the Russians, who need industrial skilled training in some techniques.

There are approximately 25 training films available which may be obtained from a number of agencies, such as the Social Security Administration, the Works Projects Administration, Civilian Conservation Corps, National Youth Administration, and others. The principal vocational training films, as is widely known, have been made, and will be made, by the Office of Education, under supervision of Dr. John W. Studebaker, Dr. C. F. Klinefelter, and under the direction of Floyde E. Brooker. Eighteen of these films have been finished, two will be finished before this is published, and ten will be ready in January. These thirty training films, virtually classics in the instruction of skills in machine work, are the earliest products of the fifty training films scheduled by the Office of Education. The balance of the fifty will be produced rapidly during the early part of 1942.

These Office of Education films also include the shipbuilding series, likewise produced under the direction of Floyde E. Brooker, at the naval shipyards at Newport News, Va., with the help of the Navy, the U. S. Maritime Commission, and with the general cooperation of the Federal Bureau of Investigation, and the Navy Intelligence section. This shipbuilding series, for use in all areas where shipbuilding is being rushed, has the technical aid of the foremost shipbuilding machinists and technicians in America. The need for this series is obvious when you realize that at least six times as many merchant ships will be built in the coming year as were built in 1941, and that the Navy tonnage will be expanded from 1,500,000 to 5,000,000 tons.

The training films produced by the Office of Education will be available to all agencies of the Government, to all vocational training schools, and to all training sections in industry, as well as to all other non-Government agencies which have anything to do with the training of skilled workers. The need of skilled workers grows by leaps and bounds; and the need of films to aid in the training apparently has no

(*Please turn to Page Thirty-six*)

BUSINESS SCREEN

Victory Training Edition

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★ ★ ★

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ANNOUNCES
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2. Turning Work of 2 Diameters
3. Cutting a Taper With the Compound Rest and With the Taper Attachment
4. Drilling, Boring and Reaming Work Held in Chuck
5. Cutting an External National Fine Thread

5 ON THE MILLING MACHINE

A. The Milling Machine

1. Cutting Keyways
2. Straddle and Surface Milling to Close Tolerances
3. Straddle Milling
4. Plain Indexing and Cutting a Spur Gear

3 ON THE VERTICAL BORING MILL

1. Rough Facing, Turning and Drilling on a Vertical Turret Lathe
2. Rough Facing and Boring and Turning a Shoulder on a Vertical Turret Lathe
3. Facing, Turning, Boring, Grooving, Chamfering on a Vertical Turret Lathe Using 2 Heads

5 ON PRECISION MEASURING

1. The Steel Scale
2. The Micrometer
3. Fixed Gages
4. Vernier Scale
5. Height Gages and Standard Indicators

THESE 32 TITLES WILL BE RELEASED SOON:

- 3 On the Shaper
- 2 On the Radial Drill
- 5 On Bench Work
- 5 On Bench Work and Centering
- 2 On the Lathe
- 1 On the Sensitive Drill
- 2 On the Vertical Drill
- 10 On SHIPBUILDING
- 2 On Action of Single-Point Cutting Tools

Fifty 16mm Sound on Film Subjects

The Whole Country has hoped for some method by which the training of defense workers might be hastened. Workers themselves have been anxious to acquire specialized skills. Now here is a powerful aid—in motion pictures that help to teach machine shop work!

Produced for U. S. Government—These films were made under the direction of the U. S. Office of Education, Federal Security Agency. These important teaching tools were primarily designed to aid and expand the nation's defense effort.

Accurate . . . Authentic—The pictures are accurate...authentic. They conform to the best methods in machine shop practice. They were supervised by old line experts. Leading American industries cooperated in their making. Those who have seen them call them one of the greatest contributions ever made to American industry and American workers.

Low Cost—These instructional films are being sold at the lowest possible cost to give them the widest possible use. Your cost is less than $9.00 per reel! All subjects are available in 16mm Sound On Film. Eighteen titles are now ready. Every training school, every factory, every plant maintaining machine shop activities needs these great teaching aids!

FREE CATALOGUE! Send today for free catalogue describing each film listed at the left. We will gladly put you on our mailing list for information about future releases. Address all inquiries to:

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when little light is available

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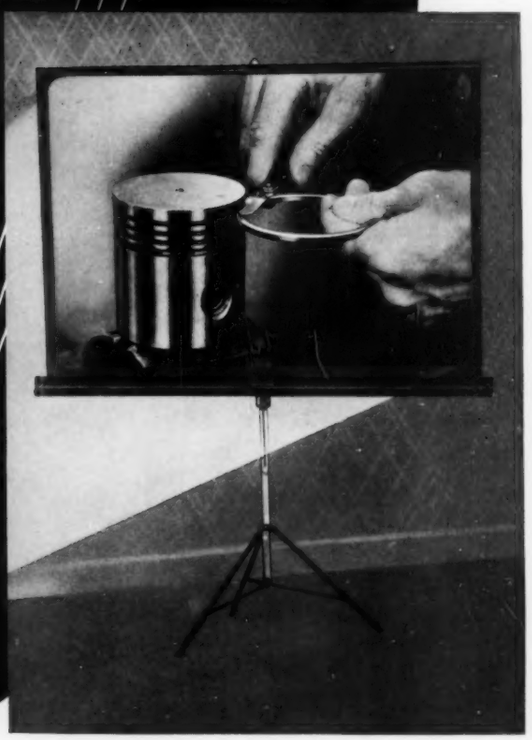

Scene from "That High Power Top Inch", shown on a Da-Lite Challenger Screen.—America's most popular portable screen.

"*Engineered* FOR GREATER CONVENIENCE

The ease with which the Da-Lite Challenger Screen can be set up and taken down is an important reason why so many leading industrial film users prefer Da-Lite equipment. The Challenger combines in one unit a spring-roller-mounted glass-beaded surface and a rigid sturdy folding tripod. It is the only screen that has SQUARE TUBING in both the center rod of the tripod and the extension support and is the only screen that can be adjusted in height merely by releasing a spring latch and rasing the extension support. It can be set up anywhere in 15 seconds, yet folds compactly for easy carrying. 12 sizes from 30 inches by 40 inches to 70 inches by 94 inches inclusive. From $12.50 up. Price slightly higher on the Pacific Coast.

To explain the advantages of Perfect Circle piston rings to servicemen in the automotive industry, The Perfect Circle Company has found sound slidefilms very effective. Its latest production entitled "That High Power Top Inch," made by Associated Sales Company, dramatically shows the *most efficient methods* of installing and servicing piston rings. To assure the most efficient presentation of this slidefilm, The Perfect Circle Company has recently started *using Da-Lite Glass-Beaded Screens.*

Mr. Stanley Murray, Assistant Advertising Manager, writes—"In the past ten years we have used many films and types of screens in our sales promotion work and we have found these new screens to be the *most successful we have ever used.* They are quickly set up and seem to be "engineered" to help a person put on a good show rather than to be a source of annoyance like so many folding screens that we have used in the past. The surface of the screen reflects the film exceptionally well. We can whole-heartedly recommend this screen to any of your potential users."

Your industrial slidefilms and motion pictures also deserve projection on Da-Lite Glass-Beaded Screens. Ask your producer or supplier about them or write Dept. 12B for latest catalog.

THE DA-LITE SCREEN COMPANY, INC.

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The Better the Sound the Better the Picture... and RCA Leads in Sound Development!

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Look to RCA for Leadership

Recent tremendous improvements in sound recording are directly due to RCA. The Duplex Variable-Area Sound Track, Split-Wave Recording that virtually eliminates ground noise, and Ultra-Violet Light Recording that vastly improves definition, are all RCA firsts. And RCA continues to lead in the research and development of sound.

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Republic Productions, Inc.
RKO Radio Pictures, Inc.
Twentieth Century-Fox Film Corp.
Walt Disney Productions
Warner Bros. Pictures, Inc.

Companies Specializing in Industrial and Advertising Films

Alexander Film Co., Colorado Springs, Colorado
Burton Holmes Films, Inc., Chicago, Illinois
Chicago Film Laboratory, Inc., Chicago, Illinois
Ideal Sound Studios, Hudson Heights, New Jersey
Motion Picture Adv. Service Co., New Orleans, Louisiana
Ray-Bell Films, Inc., St. Paul, Minnesota
West Coast Service Studios, New York, New York

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THE VICTORY TRAINING EDITION OF BUSINESS SCREEN MAGAZINE

"The American motion picture is one of our most effective media in informing and entertaining our citizens. . . . The motion picture, especially as used by the Federal Government, has a very useful contribution to make during the war emergency."
—FRANKLIN D. ROOSEVELT

ISSUE ONE • THE MAGAZINE OF VOCATIONAL & EDUCATIONAL FILMS • VOLUME FOUR

Our Industry Answers the Call to Arms

● VISUAL EQUIPMENT manufacturers and industrial film producers alike have answered America's call to the colors. This is the hour of destiny for the industry, with the armed services and the industrial war production program, as well as civilian defense, health and nutrition programs, agricultural production and public morale depending upon the film mediums as the *primary* educational medium.

Answering the call, our visual equipment manufacturers have pledged the Division of Civilian Supply of the Office of Production Management that the total resources of their plants are now turned to supplying the training classrooms and group centers of the nation with the essential equipment needed for these purposes. In this activity, your editor has given his services throughout the past months to serve as chairman of the industry's visual equipment manufacturers' association. We have been proud to serve.

Training for Victory

★ Visual educators, shop instructors and industrialists alike will be inspired, as we have been, by the tremendous production accomplishment now nearing completion by the U. S. Office of Education in the studios of the industry's most able and experienced industrial film producers.

Already the reports are flowing into this magazine and to the training chiefs in Washington of the results which the Victory Training program is accomplishing. Hardly begun, the program will gain momentum as the number of reels in use and the methods of use are increased and improved.

We can honestly say that these producers have given their all. The films were produced at half the cost the Government has paid in the past; at a *tenth* of the cost of some well-publicized creations. But into them has been poured the craftsmanship and skill of three decades of experience in this sort of work. They are *training* films, with technical animation, closeups, microphotography, and other industrial techniques applied without stint to assure real *training* results.

Information Vs. Training

★ Let no man confuse the two tasks which lay before our Federal Government in this critical hour. To the Office of Government Reports and the Co-ordinator of Government Films, Mr. Lowell Mellett, the President has assigned the task of planning and organizing Government motion picture production and distribution "as is deemed necessary to inform and instruct *the public* during the war-time crisis."

To Mr. Mellett and his able Deputy Co-ordinator Arch Mercey, your editor pledges the resources of BUSINESS SCREEN and the industry in carrying out this great task. We are, indeed, proud to acknowledge that we were the first and only publication to call attention to this need several months ago.

The highly technical and complex job of providing the industrial training program with visual materials is being successfully carried out by the proper educational authorities already charged with similar responsibilities. This is a *training* task which has earned the approbation of both Government and industrial officials concerned.

The trained specialists who have been at work on this program for many months have the experience and the proven record of production to which the thirty films reviewed in this issue are sufficient testimony. There are no persons in all Government so well qualified to continue and to achieve even greater success than this hard-working crew and their efficient superiors in the United States Office of Education.

Civilian Defense Program

★ We have been in touch with responsible individuals in the auto industry and with dealers who heartily approve of this idea: hold weekly classes in civilian defense procedures in your local auto dealer's salesroom. Some of these are projector-equipped. They are more readily available in business sections, particularly in smaller cities, than the local schools.

It costs money to keep a school open for these purposes in the evening. Heating plants, maintenance men, and janitors must be paid at considerable expense. The local auto dealer will be glad to help. Let's take advantage of his facilities, honor his courtesy and at the same time do this public training task more efficiently. It can be done if we use every physical asset at this vast nation's command.

Keep Them Rolling!

★ The income which the family auto produces in state and federal taxes as well as the common sense of keeping the dealer organizations going, calls for a nation-wide program of service and conservation teaching directed at the public and the dealer's own organization.

Mass "selling" did a great job for Chevrolet and others—why not use mass "teaching" to preserve what we have. Washington will heartily approve of such conservation and "anti-gyp" education. Safety, maintenance, tire care, all can be taught in a nation-wide series of free evening classes held under the joint auspices of motor, oil and tire companies. The public will do its part—the dealer urgently needs this kind of effort and no better way could be imagined for the sponsors to retain the goodwill and advertising in which they have so many millions invested.

What are we waiting for? Do you need any more testimony to the value of this medium than its present wholesale adoption by Government is now providing?

A Word of Regret

Pages of unused articles, reviews of outstanding recent film productions, etc., (some of them listed on the next page) remain in our publication files for appearance in our Mid-February number. In recognition of our country's great need—which is answered in this Victory Training program—we have dedicated every possible page to the greatest accomplishment in visual education the country has ever seen.
—O. H. C.

VISUAL MEDIA SPEED TRAINING

Motion pictures and slide-films are making possible the speedy training of millions of men who must man the machines in our new war production Program. To this Victory Training task, Business Screen dedicates this first issue of 1942.

COVER: THE PRECISION GAGE IS AMERICA'S SYMBOL OF VICTORY: *(picture by Loucks & Norling)*

America Trains Millions for New War Industries

—report shows need for visual training aids

● THE NATIONAL EFFORT to strengthen defense of this country necessitated the expansion of many industrial plants, the conversion of many others, and the establishment of new plants in the change of our industry from peace-time production to the production of war materials. This created a need for great numbers of technical, professional and skilled workers of all grades. Particularly acute was the need in the machine tool, aircraft, and shipbuilding industries. It was obvious that the existing supply of unemployed workers already qualified in defense occupations would be quickly exhausted and that the additional requirements must be met through the development of the skills and knowledge of employed workers in order to fit them for advancement and the development of the initial skill of new workers.

Recognizing that the solution of this problem would involve training programs of national scope, Congress, on June 27, 1940, appropriated funds to the U. S. Office of Education for the establishment and operation of defense training.

MILLIONS RECEIVE TRAINING

As a result of this and succeeding appropriations for the same purpose, defense training programs are now being conducted by the public educational authorities of every State in the Union for the development of qualified workers for defense industries. A total of 2,477,400 persons have received instruction through these programs since their inception, July 1, 1940. Assisting in the carrying out of these programs are 155 colleges and universities, 1,000 public vocational and trade schools and 10,000 public school shops.

ENGINEERING, SCIENCE & MANAGEMENT TRAINING

★ To meet the needs for technical, professional and supervisory personnel in defense industries, a program was inaugurated and carried on in the degree granting engineering schools of our colleges and universities. This program is being accomplished through the utilization of extensive and highly developed training facilities comprising teaching staffs, plants, and equipment of these institutions. The greater proportion of courses of this program are designed to up grade technical and professional personnel employed in defense occupations. The remaining courses are designed to prepare persons with suitable educational qualifications for positions in defense industries. As of December 1, 1941, there were 83,000 persons enrolled in these courses.

A total of 220,000 persons have received instruction in these courses during the last year. Initially the program was restricted to engineering occupations but it soon became apparent that there was need for technical and professional persons in other defense occupations. Beginning with the first of July this program was broadened to include science and management courses needed by defense industries. With the expansion of industries incident to the active participation of this country in war, the need for supervisory personnel will be greatly increased. The authorities in charge of this program are engaged in a rapid expansion of the training of supervisory personnel to keep in step with the needs of our expanding defense industries.

VOCATIONAL TRAINING FOR DEFENSE WORKERS

★ To assist defense industries to meet the needs for additional craftsmen and production workers, a training program beginning July 1, 1940, was inaugurated and carried on by our public vocational school system utilizing the teaching staffs and existing plants and equipment, worth one and a quarter billion dollars. This program consists of two parts, namely, supplementary courses to up-grade employed workers and pre-employment courses for unemployed workers.

Supplementary courses are designed to assist in the development of additional knowledge and skill of employed workers being prepared for advancement. This program is considered of paramount importance as it directly aids and expedites the Training Within Industry Program of OPM designed to meet the shortage of skilled workers in defense industries. From an enrollment of 25,000 workers one month after this program started the number of trainees has increased in a regular progression to 179,140 as of December 1, 1941. During the 18 months this program has been operated there have been 835,400 employed workers enrolled.

WAR INCREASES NEED

The immediate effect of the outbreak of war upon this program is the need for expansion in order to assist defense industries in meeting their skilled labor problem incident to increase in production. During the current fiscal year it was planned to train 900,000 workers in this program. It is certain that during the last half of this current fiscal year the originally planned program will be expanded insofar as possible with existing facilities. During the next year the number of employed workers requiring supplementary courses in related subjects and in the shop practices related to their daily job, will be materially greater.

Pre-employment courses are designed to develop initial skill in workers essential to employment in defense occupations. The great expansion incident to the production of war materials also created a need for large numbers of production workers, that is, semi-skilled or single skill workers as well as a large number of replacements for workers who are upgraded. Through these short intensive courses persons who had previous experience in a defense occupation, but who have not actively engaged in that occupation for a period of time, have had an opportunity to refresh their skill.

PRIORITY UNEMPLOYMENT AID

Workers displaced due to priorities or other governmental restrictions placed on non-defense industries are given these courses to build on the skill and knowledge of their regular occupations. These courses are also given for workers with little or no previous industrial experience. This program is being accomplished through the utilization of the plants and equipment and teaching staffs of our public vocational schools. These courses are designed to give workers specific jobs known to be open in industry.

The enrollment of workers taking pre-employment courses as of December 1, 1941, was 127,264. During the 17 months that these courses have been in operation a total of 712,400 enrollments have been made. A large percent of those completing these courses have entered private employment.

WPA WORKERS TRAINED

The Works Projects Administration reports as of December 1, 1941, indicate that 133,490 WPA workers have already received training in this program. Of this number 89,089 have voluntarily left the WPA which would indicate that they have obtained gainful employment.

During the next year the number of workers to be retrained will be materially increased over the number trained during the past year, and conversely, the number of workers receiving refresher training will decrease materially. The total number of trainees receiving pre-employment training must be increased to meet the needs of industries if we are to secure maximum production.

OUT-OF-SCHOOL RURAL & NON-RURAL TRAINING

★ In order to provide opportunities for rural youth to receive defense training, Congress appropriated funds for the conduct of courses in rural communities. These courses are carried out through the utilization of the shops of rural public schools. This program is being carried on in the 2,500 different com-

(*Please turn to Page* 29)

COMING FEATURES IN BUSINESS SCREEN

Editor's Note: Because of the present critical need for training aids in war industries, this entire edition of Business Screen has been dedicated to the Victory Training Program of the U. S. Office of Education. Features and Reviews contemplated have been carried over into the mid-February number in preparation. These additional features are also scheduled for the forthcoming issue of Business Screen:

★ A Complete Index of All Visual Aids for Vocational Training, Revised to February, 1942.

★ The Church and Visual Aids: How modern church organizations use and produce films.

★ Motion Study and the Motion Picture: A survey of the work of the outstanding authority in this field.

★ Film Education for the Western Hemisphere.

★ Visual Aids for Civilian Defense: Feature Article.

plus news and reviews of outstanding new film releases.

A U. S. Army training film camera crew goes into action in the field.

Army's films and production will be reviewed in an early Business Screen.

Full Speed to Victory!

By John W. Studebaker, *U. S. Commissioner of Education*

MONTHS AGO there was placed over the main entrance to the office of the Federal Security Administrator Paul V. McNutt the commanding slogan, "Time Is Short." It served to quicken the pace of all who entered there as they went about their duties in connection with "defense." And the Administrator, from the first day a Nazi foot was set on Polish soil, was himself a living example of determination and celerity in action.

Since December 7 all vestiges of inhibitions have been removed; the slogan for the entire Nation is now, "Full Speed Ahead to Victory."

The need for speed and precision in war industries requires no additional emphasis. Twenty million pairs of hands in those industries, guided by alert and trained minds, must possess unexcelled dexterity and sustained power in action. To the extent that the workers *see* and understand the principles of mechanics and have the skills needed for maximum production our output of the implements of warfare will increase.

For two reasons, therefore, we should make the widest use of effective visual aids such as the training motion pictures now in production by the U. S. Office of Education in developing the abilities of industrial workers. First, instructional aids speed up the learning process, thus making available more skilled hands on any given date than the Nation would otherwise have at its service; and second, the quality of the workmanship of our gigantic industrial army will be greatly improved. For these reasons an adequate supply of carefully planned and well executed sound-on-film pictures to aid in training for war service is a prerequisite to "Full Speed Ahead to Victory."

J. W. Studebaker

U. S. Commissioner of Education

GUEST EDITORIAL: A FOREWORD TO THE VICTORY TRAINING PROGRAM

In 1,000 vocational schools in the 48 states, Hawaii and Puerto Rico, in 10,000 school shops, and in 155 colleges and universities, worker training is now on a 24-hour daily schedule.

Teaching Fundamentals in Victory Training

BY C. F. Klinefelter, *Assistant to the U. S. Commissioner of Education*

FOLLOWING the decision by U. S. Commissioner of Education John W. Studebaker to inaugurate a program of producing motion pictures designed expressly as teaching aids for the defense training program, an Office of Education committee was established, composed, with the exception of two representatives of the Engineering Defense Training Program, of a number of persons who were or had formerly been employed in the Trade and Industrial Education Service of the Vocational Division. Having decided that the first motion pictures should be made for use in the most critical bottleneck of all defense production activities — machine shop work — a comprehensive analysis of basic operations and machine tools was laid out by the committee.

This trade analysis was then subdivided by the committee into approximately 150 units or teaching lessons, which could be treated adequately in units of 400 foot 16mm. film. With the exception of certain units designed to explain items of basic technical knowledge and fundamental procedures common to a number of operations, the units were laid out in terms of work jobs, such as mechanics and operators are actually assigned from day to day in the shop. Further, the units were arranged in terms of learning difficulties rather than of production difficulties.

Step-by-Step Analysis

Having developed the trade analysis to this point, with the assistance of the committee, the technical consultant on machine shop practice next developed an individual synopsis of the subject matter to be incorporated in each teaching unit. The director of visual aids then took the synopsis and added suggestions as to methods of treating the subject matter so as to utilize the most effective devices to clearly portray the material.

Richards Training Formula

In constructing each synopsis, consideration was given to Richards' Training Formula, in which *E*fficiency of training varies as: the degree of *M*anipulative skill required; the *T*echnical knowledge one must have to do the job at all; auxiliary *I*nformation in excess of that required for a particular job; trade *J*udgment and: *MO*rale. This was because of the designed use of the films as teaching aids not only in connection with the giving of initial training in preemployment courses, but in supplemental courses for employed workers as well. The deliberate aim is to assist in developing *intelligent* workers at each and every stage.

As detailed shooting scripts were developed from the synopses, each one was checked to see that it was constructed in conformity with the standard steps of teaching, in which the learner's mind is first of all *Prepared* for what he is to be taught, followed by the job he is to do being *Presented* or shown to the learner by the teacher, after which the learner is placed at the job and the teacher stands by until the learner has *Applied* what he has just been taught while the teacher is available to patch up or straighten out anything the learner has not fully understood. The final step in teaching manipulative work only

appears after the learner has been *Tested* as to his ability to continue to perform similar jobs without supervision.

An understanding of the standard steps of teaching is essential in order to understand clearly the basic limitations of such teaching aids. If shown to a group of learners prior to taking the group to a machine to witness an actual demonstration, the film will *Prepare* the learner's mind, and will also *Present* or demonstrate how the job is done. Following such a demonstration portrayed in the film, the shop instructor should then at once take the group of learners to the actual machine and demonstrate or show just how the job is done with real tools and materials. After the group is assigned to machines to *Apply* what they have just been taught, the teacher may decide that one or more of the group need to see the film again in order to understand more clearly some phase of the instructions, and they can view the film again without disturbing the rest of the class.

Films Aid the Teacher

It must be emphasized, however, that learners, merely witnessing a demonstration shown by a motion picture film, cannot be expected to be able to actually do the job without having a demonstration by the instructor on a real machine and having a chance to try then to do the job themselves. These films cannot take the place of a skilled instructor. In his hands they can be very effective teaching tools if he knows how to use them to advantage.

An examination of any of the films dealing with a work operation will reveal the fact that in no case does the film attempt to cover each and every operation from start to finish and to impart each and every item of information associated with the job. This treatment is deliberate. It was decided upon partly in order to impress on shop instructors that they must actively teach and not become mere projectionists. In addition, it was deemed wise, in using the most expensive of all film media — the motion picture —to concentrate upon those parts of the teaching unit which the average shop instructor has some difficulty in getting a group of learners to comprehend.

State Committees Named

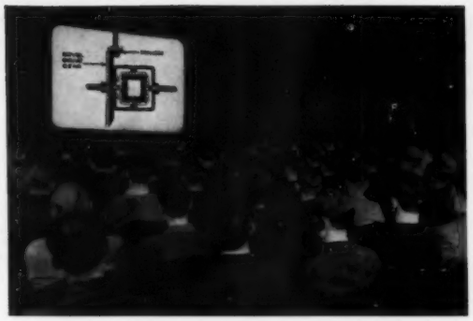
In order to speed up the actual production of the films, State and local advisory committees were created at or near the place of production by State and local officials in charge of vocational education and defense training. Following the development of the film synopses by the technical consultant on machine shop practice, and the director of visual aids, the script writers of the several producing companies began to write scripts which were checked and rechecked with the advisory committees.

The committees did yeoman service in checking the scripts, in viewing rushes, and, on occasion, in suggesting improved set-ups for the shooting. The assistance of the committees has been of inestimable value in insuring accuracy, acceptable terminology, conformity to good standard shop practice, and sound treatment of teaching problems.

As mentioned in the beginning of this account, the Office of Education committee made an analysis of approximately 150 teaching units to cover machine shop operations. When funds became available to finance only part of the program, 40 of the units that seemed to be most urgently needed were selected by the committee. Later, 10 units were awarded to make a beginning in highly critical shipbuilding skills.

Analyse Further Needs

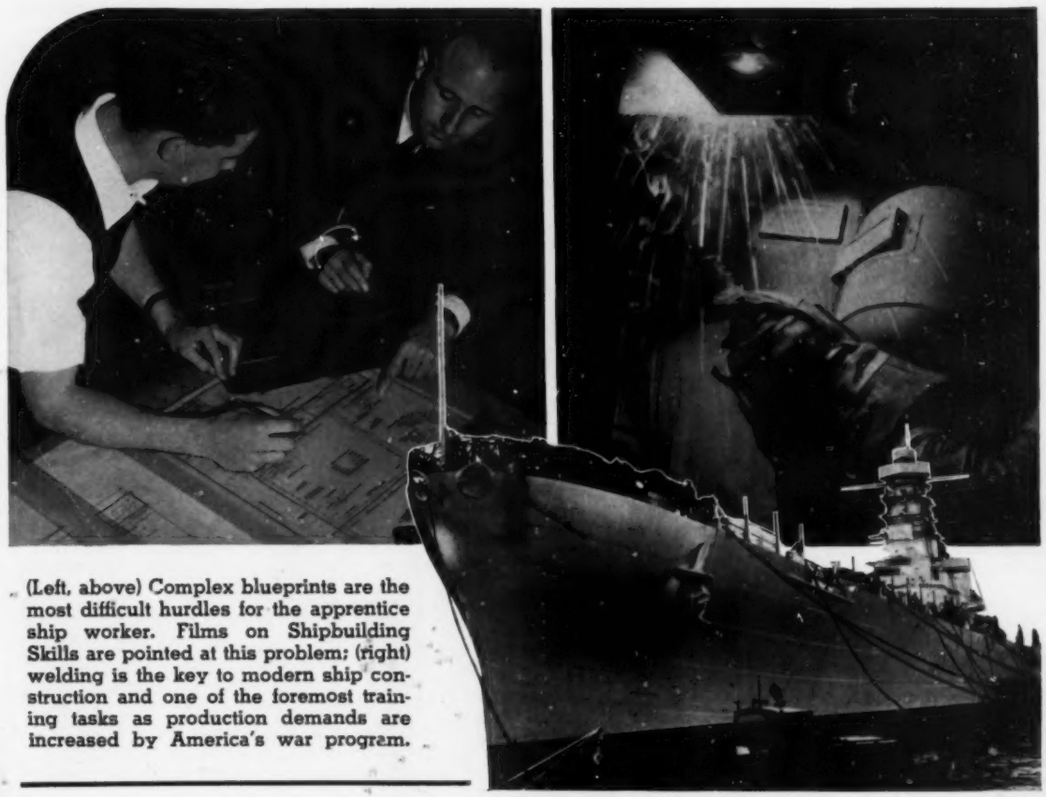
As soon as additional funds are made available to extend the program, the most critical defense training fields will be analyzed in similar manner and contracts for production awarded accordingly. It is definitely planned to make some film strips and teachers' manuals to accompany the present films on machine shop practice and shipbuilding and any future production will encompass motion pictures, where motion is essential, film strips, loops, and teachers' manuals.



"If shown to a group of learners prior to taking the group to a machine to witness an actual demonstration, the film will prepare the learner's mind."

How to Obtain the Victory Training Films

*Thirty films on Machine Tool Operation and Shipbuilding Skills, produced by leading industrial film studios for the U. S. Office of Education, are reviewed in these pages. Castle Films, Inc. of New York City, Chicago and San Francisco is the national distributor, utilizing the services of audio-visual representatives throughout the entire United States from whom the films are available at the prices quoted in these pages.



(Left, above) Complex blueprints are the most difficult hurdles for the apprentice ship worker. Films on Shipbuilding Skills are pointed at this problem: (right) welding is the key to modern ship construction and one of the foremost training tasks as production demands are increased by America's war program.

PRECISION MEASURING

1 THE STEEL RULE . . . .

475 feet, 16mm. sound-on-film, Cost $11.37

This subject discusses in considerable detail the steel rule, emphasizing the variations of the steel rule; the type of scales found on them; their proper use; and the correct procedures in transferring measurement by means of calipers and dividers.

The motion picture opens with a pictorial discussion of measurement and its importance in modern mass production. Pictures, blueprints, and commentary combine to limit the motion picture to the discussion of the measurement of distance in the form of length, height, width, and depth. Closeups of the blueprint showing both fractional dimensions and decimal dimensions illustrate the explanation of the commentary that the steel rule is ordinarily used in all dimensions given in fractional parts of an inch, while the micrometer is ordinarily used for the measurement of all dimensions given in decimal fractions of an inch.

Closeups call attention to the various scales available on steel rules, running from eighths to hundredths as the commentary stresses the necessity of checking the divisions on the scale being used in order to avoid error. Various forms of the steel rule are shown and their specific use illustrated and explained. Emphasis is given to the correct methods for taking measurements with the steel rule on ends of work, the diameter of shafts, the lengths of cylinders, and the width of holes.

Closeups and commentary combine to show the use of the outside and inside caliper and the correct method of procedure used when transferring a measurement taken by a caliper to a rule. Emphasis is given to the proper care and maintenance of the tools and to the need for precision in holding a caliper to a rule. The use of dividers and a trammel in laying out work in conjunction with a steel rule is also illustrated.

The film closes with a series of review scenes as the commentary calls attention to the usefulness of the steel rule and the necessity for proper care to maintain its accuracy.

2 THE MICROMETER . . . .

525 feet, 16mm. sound-on-film, Cost $12.37

This motion picture presents in considerable detail an explanation of the basic principles on which the micrometer works; correct care, use, and maintenance of a micrometer; and the various forms of the micrometer developed to measure outside lengths, inside lengths, and depths.

The film opens with an extensive use of animation which names the parts of the micrometer and explains in considerable detail the principle on which it works. Animation with printed titles, combined with commentary, shows how the movement of the spindle is controlled to within a thousandth of an inch or less. Animation is also used to explain the manner in which the scales on the barrel and the thimble are read to determine the distance between the spindle and the anvil. Closeups combined with commentary call attention to the correct use of the micrometer, emphasizing the need for the development through experience of the correct "feel" in order to secure uniform readings, the need for the removing of all burrs from the surfaces to be measured to secure correct readings, and calling attention to the necessity of avoiding the dropping of the micrometer or placing of it where abrasive materials may affect it or of whirling it around. The need for checking the accuracy of the instrument at intervals is stressed as closeups and commentary combine to explain the use of standards or gages to check its accuracy. Two forms of the inside micrometer are shown: the jaw and the rod types. Closeups show the use of these two instruments for measuring inside diameter and the manner in which the barrel and thimble scales are read. The rod type of inside micrometer is shown being used with several different lengths of extension rods to measure inside diameters.

The depth micrometer and its correct use are also demonstrated. Illustrations of the various types, with varying lengths of extension rod, combine with commentary to call attention to the flexibility of this instrument and its correct use.

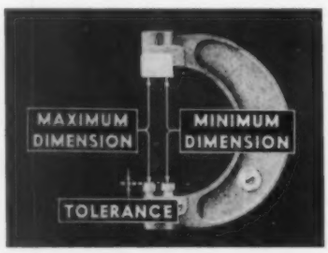
The film closes with a review of the important points in the correct care, use, and maintenance of all micrometers as the commentary stresses the importance of this care in keeping the instrument accurate.

3 FIXED GAGES . . . .

600 feet, 16mm. sound-on-film, Cost $13.87

This film gives in considerable detail, an explanation and definition of the various forms of fixed gages, a demonstration in the correct use and care of fixed gages, and emphasizes their importance in modern mass production. A series of views in the inspection room of a modern factory demonstrates several types of common fixed gages in actual use. There follows explanations of the fixed gages commonly used to check outside and inside measurements, internal and external tapers, threads, shoulders and tang recesses.

Various forms and sizes of the snap gages are demonstrated. Go and not-go gages are shown, their parts named, and their correct use demonstrated, in the measurement of flat pieces, of large cylindrical, and small cylindrical pieces. Closeups, animation, and commentary are combined to explain and define tolerance and to show how the snap gages assure parts being within the tolerance allowed. Various forms of go, not-go gages as they are applied to the diameter of holes, to threads, and to tapers are shown in use. Taper ring gages and taper plug gages are demonstrated in the checking of external and internal tapers. Closeups and commentary call attention to the constant need for careful use of gages in keeping them accurate.



Animation is used to explain the manner in which the flush pin gage is used. Closeups of the flush pin gage in actual operation show how it checks the specifications of shoulders and the like.

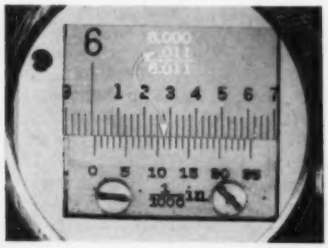
Throughout the entire picture, emphasis is given to the functions of these gages, their proper use to secure accurate and uniform inspection and their proper maintenance to insure accuracy.

4 VERNIER SCALE . . . .

675 feet, 16mm. sound-on-film, Cost $15.37

This training motion picture offers a detailed study, largely in animation, of the principles of the vernier scale and its application to precision measurement. The reading of the vernier scale and the precautions necessary in the care of tools having a vernier scale are stressed.

Animation is combined with commentary to explain the principle of the vernier scale. The explanation begins with the five-part vernier. This explains the principles of all vernier scales showing how each division on the vernier scale subdivides each unit of the main scale into the same number of equal divisions that there are on the vernier. The principles are further demonstrated with views of a 10-part vernier used on a micrometer and a 25-part vernier used on a vernier caliper. Animation combined with extreme closeups of the scale itself and commentary, explain and demonstrate the reading of a vernier scale.



The care that is necessary to secure correct readings with these fine precision measuring tools is portrayed in a series of pictures showing a vernier micrometer and a vernier caliper in actual use. Attention is called to the two sides and their accompanying scale on the vernier caliper; the one used for outside measurements and the other for inside measurements. Several settings of these vernier scales are shown in extreme closeups to provide some experience for the student in their reading.

The film closes with scenes and commentary emphasizing the care that is required to maintain the accuracy of all tools using vernier scales.

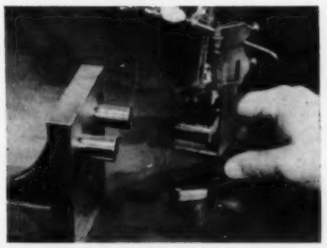
5 HEIGHT GAGES AND STANDARD INDICATORS . . . .

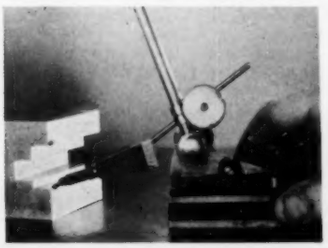
425 feet, 16mm. sound-on-film, Cost $8.97

This subject reviews the fundamental principles and reading of a vernier scale as used on a height gage, shows several forms of test indicators, and demonstrates their use.

The film opens with animation which explains how vernier scales are read and why they are used. The parts of a vernier height gage are shown and their use demonstrated. Closeups and commentary emphasize the steps used in securing an accurate reading on a vernier height gage. This tool is demonstrated as it is used for a precision job of lay-out on an angle plate.

The second portion of the film deals with test indicators showing the dial form as well as other variants. Closeups of a dial indicator in actual use, combine with commentary to explain the function and use of dial indicators in measuring fine deviations from previously determined measurement. Various forms of these test indicators are shown being used to check the accuracy of lay-out, the flatness of a surface, the centering of work on a vertical boring mill, the centering of work between centers of a lathe, and the depth of a cut on a milling machine. These demonstrations also show the use of vernier height gage and gage blocks in conjunction with the indicator.



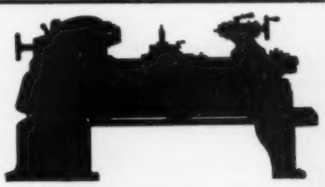


Throughout the motion picture special emphasis is given to the care necessary to maintain the accuracy of these precision measuring tools.

The Complete Set of Five Subjects on
PRECISION MEASUREMENT COSTS $61.95
(Individual titles may be purchased separately)

Total Footage, 2700 feet, 16mm. sound-on-film
All prices include reel and can

THE ENGINE LATHE



1 ROUGH TURNING BETWEEN CENTERS . 550 feet, 16mm. sound-on-film, Cost $12.87

This training motion picture emphasizes and presents in considerable detail the care and operation of the machine, the identification of the various controls and parts of the machine used in rough turning, the correct setting of rough turning tools, the safety precautions necessary for both operator and machine, and the necessity for following a blueprint in performing any job.

The job selected for this demonstration is rough turning a pin of rough stock such as the pins used in rear axle assembly. The rough stock is 2½ inches in diameter and has already been cut and faced to length. Close-ups of the blueprint combined with commentary emphasize the necessity for following the blueprint and give the problem that in this job the pin is to be rough turned to approximately 2 inches in diameter, leaving .015 for grinding.

As the operator prepares to do the job, detailed views of his clothing calls attention to the safety features involved in the operator's dress. The engine lathe is cleaned and oiled, with particular attention being given to the ways, and the centers of the lathe. The dog plate is screwed onto the head stock spindle, the centers are put into their proper positions. The operator checks with his blueprint to make certain he has the right piece of stock. The accompanying commentary names the parts of the machine as they are used and explains the reason for each step.

The rough stock is placed between the centers. Close-ups and commentary point out the necessity for constantly lubricating the tail stock center of the work. A series of pop-in views gives close-ups of rough turning, finishing, parting, threading and radius forming tool. The operator grinds his roughing tools as the commentator calls attention to the safety measures and to the manner in which the tool is held against the wheel. Extreme close-ups with titles give the various angles of the roughing tool with the names and the degrees of these angles.

Special attention is given to the mounting of the tool in the tool post, at the correct angle and position. Close-ups combined with commentary call attention to the need for the tightness of the tool and for as little overhang as possible. The operator takes a skimming check, checks with the blueprint, measures the cut with the micrometer, and calculates the full depth of the cut. Animation explains that the full cut taken is double the cut that is set on the cross feed index. The full depth of cut is started, checked the second time with the micrometer, and then continued as far as possible. Magnified views of the chip as it flows from the edge of the roughing tool illustrate the action of cutting tools and show the jagged razor edges of the chip. The piece is then reversed between centers, the dog is changed, the tail center again lubricated, and the cut finished.

The film closes with a series of brief review shots that recall and emphasize again the important steps in rough turning between centers.

2 TURNING WORK OF 2 DIAMETERS . . . 500 feet, 16mm. sound-on-film, Cost $11.87

This training motion picture emphasizes the care and operation of the machine, the necessity for advance planning of the work, the setup for the job, the necessity for checking with the blueprint, laying off and nicking the piece for machining, rough and finish turning to close tolerances, rough and finish facing, and rough and finish turning of fillets.

The film provides a detailed demonstration of the sequence of operations followed when turning a gear blank with its shaft from a solid piece of round stock cut to the proper length, faced, and center. The tail center hole is lubricated, and the shaft is placed between the centers of the lathe.

The importance of the blueprint in guiding the operator through this job is emphasized. Closeups of the blueprint itself give the dimensions to which the operator works. A roughing tool bit is selected, placed in the tool holder in the proper position and at the correct angle. Double printing, arrows, and commentary emphasize the reasons for this angle and the necessity for as little overhang as possible. The entire piece is rough turned as far as the dog will permit. A facing tool is used to face the end nearest the tail stock. Using a scale, the operator nicks the stock to indicate the location of the gear blank. Commentary is used to explain the importance of the establishment of such reference points for all measurements. The shaft is rough turned down to the proper size to establish the collar, and then finish turned down to the size given in the blueprint.

The basic types of lathe tools for rough turning, finishing, facing, and fillet forming are shown. Animation, closeups, arrows, and commentary combine to explain the distinctive differences of the finishing tool and the reasons for the various angles of its faces. A radius tool is used to finish the right face of the collar and to form the fillet. The accompanying commentary explains that in such small cuts the hand feed is used. The work is reversed and this time a small piece of brass is used to prevent damage to the finished surface of the shaft. The roughing, finishing, turning and facing cuts are completed on the other end of the shaft, and the fillet is formed.

The film closes with a review of the rough cuts, the location and marking of the collar, the rough turning of the shaft to size, the finish and facing cuts on the shaft, the collar, and the end. The closing scene between the operator and the shop foreman shows the foreman checking the piece, and the dialogue gives the criterion of a good job; namely, cut to dimensions and in good time.

3 CUTTING A TAPER WITH COMPOUND REST AND TAPER ATTACHMENT

400 feet, 16mm. sound-on-film, Cost $8.47

This training motion picture shows the operations necessary to cut a sharp and slight taper on a gear blank. Considerable detail and emphasis are given to the care and operation of the machine, the use of the compound rest for turning a sharp angle surface, the setting of a compound for turning any angle within its range, the setting of the tool for taper turning, the principles of the taper attachment, the correct setting of the taper attachment for the given angle, and the use of a protractor and a ring gage for checking the angle of taper. The problem is set with the views of a finished shaft and a blueprint, which, combined with the commentary, defines taper and distinguishes between steep and gentle tapers. Animation depicts the steps by which the job will be done as the commentary emphasizes the constant need for advanced planning of each job. The operator cleans the lathe, places the dog on the end of the semi-finished shaft, lubricates the tail center, and places the shaft between the centers.

Animation explains how the compound rest is used to cut a sharp taper. Animation is also used to explain the setting of the compound rest for the desired angle of taper when the angle on the blueprint is given in terms of the center line of work, or, as is sometimes the case, when the angle is given in terms of a line at 90° to this center line. The accompanying commentary emphasizes and explains the proper setting of the compound rest in terms of the angle of taper desired.

As the operator sets the compound rest at the proper angle, extreme close-ups show the calibration on the base of the compound rest. The compound rest is locked in place, the truing-up tool is set to the center line of the work, the cross feed is disengaged, and the cut is taken.

Close-ups show the use of the bevel protractor to check the angle of taper, as the commentary explains the correct use of this measuring tool.

The second portion of this motion picture covers the use of the taper attachment to cut a slight taper at the opposite end of the work. Detailed animation combined with commentary demonstrates and explains the working of the taper attachment in cutting a slight taper. Close-ups show the operator disconnecting the cross feed screw, fastening the bracket to the lathe bed, and tightening the clamp on the connecting bar. A magnified close-up locates and shows the graduation on the taper attachment, as the commentator explains that these permit setting the taper attachment for the cutting of the desired taper.

Using the longitudinal feed the operator takes the first cut to establish the taper. A taper ring gage is used to check the taper, indicating it is loose at the large end. The commentator calls attention to the fact that the taper attachment may be worn, that the setting is only approximate; and that the taper attachment must be set for a slightly larger taper. A second trial cut is taken and this time the angle of taper is correct. Close-ups of the blueprint show the required diameter of the shaft at the point of the taper. Another cut is started, and checked with the micrometer, as the commentary explains the adjustment of the micrometer reading in terms of the tapered surface it is measuring.

The film closes with the taper completed, as the commentator states that the work is not complete, that the gear teeth and threads will be added by other operations on other machines.

4 DRILLING, BORING AND REAMING WORK HELD IN CHUCK . . .

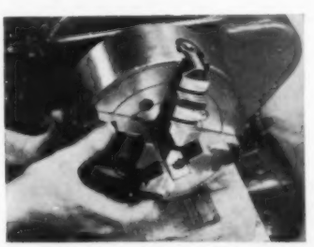
400 feet, 16mm. sound-on-film, Cost $8.47

This training motion picture presents in considerable detail the centering of a gear blank in an independent chuck, the selection and setting of the tool for facing the gear blank; drilling, boring, and reaming with the tail center; and reviews the use of the taper attachment in the making of a taper bore.

The job selected for this demonstration is a rough steel forged pinion gear blank. The first operation is that of centering the gear blank in the jaws of an independent chuck. Closeups combined with commentary provide a demonstration of the method used to center the blank accurately. A rough facing tool is set in the tool post and the forging is rough faced. Commentary calls attention to the setting of the tool and to the use of the hand feed for this operation.

A check with the blueprint indicates the size of the hole and the drill size to be used. The drill is mounted with a special holder in the tail stock spindle. A guide bar is mounted in the tool post to guide the drill into the gear. The lathe is started, and the drill is fed by the tail-stock hand wheel.

A boring tool and bar are set in the tool post, the taper attachment is set and a first boring cut is taken to establish the taper. Closeups combined with commentary serve to review the use of the taper attachment. The taper is checked with the taper plug gage. Since the taper is not correct the taper attachment is re-set and a second trial cut is taken. A new cut is taken and checked and found correct and the boring cut completed.



A taper reamer is used to finish the cut. Closeups and commentary call attention to the correct setting of the reamer, the use of cutting oil, and the use of the limit marks on the reamer.

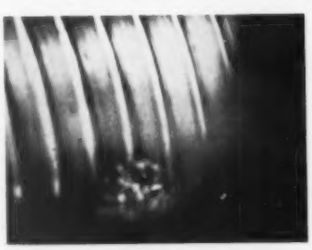
5 CUTTING AN EXTERNAL NATIONAL FINE THREAD . . . .

450 feet, 16mm. sound-on-film, Cost $9.47

This motion picture shows in considerable detail the procedures and precautions necessary when setting up a lathe for cutting a thread; the grinding and the setting of the cutting tool; the use of a thread pitch gage, and setting gage; and the operations of the lathe in the cutting of a thread.

An introductory sequence shows an acme, a square, and a national fine thread as the commentary names these threads and indicates their common uses. Animation is used to name the principal parts of a thread.

Closeups of the blueprint indicate the type of thread to be used in this case and the length of work to be threaded. The work is mounted between centers and with a parting tool the operator takes an undercut at the point where the thread ends. The accompanying commentary explains the reasons for this undercut and indicates its depth.



Animation, closeups, and commentary show the setting of the threading tool to the work by means of a setting gage. After the first test cut, the thread is checked to make certain that the pitch of the thread is correct. Considerable detail is given to the setting of the lead screw, the stop on the cross feed screw, and the use of the thread indicator dial. The correct use of the thread indicator dial is shown in closeups and in slow motion. The picture closes with a brief review of the important steps to be followed in operating a lathe for thread cutting and the checking of the finished thread to the specifications given.

The Complete Set of Five Subjects on

THE ENGINE LATHE

Costs $51.15

Total Footage, 2300 feet, 16mm. sound-on-film

(Individual titles may be bought separately)

All prices include reel and can

The Complete Set of Five Subjects on

THE MILLING MACHINE ►

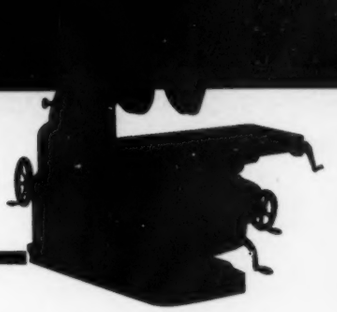
Costs $75.95

Total Footage, 3325 feet, 16mm. sound-on-film

(Individual titles may be bought separately)

All prices include reel and can

THE MILLING MACHINE



A THE MILLING MACHINE . . . .

275 feet, 16mm. sound-on-film, Cost $5.97

This motion picture provides a demonstration of a plain milling machine and shows the basic parts of the machine, locates and names the various control levers, and demonstrates the action of the table longitudinally, vertically, and cross-wise.

The film opens with a view of the milling machine as it is being set up for a job. Views of the cutter and of the table serve to illustrate the commentator's remarks that the two basic elements of the milling machine are the revolving cutter and the movable table which feeds the work to the cutter. The arbor with its assembled cutter set-up and spacing collars is shown as the commentator names these parts and calls attention to their importance.

The three basic movements of the table are demonstrated and the power controls at both the front and the side of the machine which control the movement of the table up and down, cross-wise, and in and out. Closeups of the micrometer indexes on the hand feed wheels combined with commentary call attention to the fact that the table may also be moved by hand, and that each mark on the index dial indicates a table movement of .001. Closeups and commentary call attention to the levers that are used to lock the knee, the saddle, and the cross feed, to prevent movement of these parts. Views of the revolving cutter and of the feed dial accompany the commentator's remarks that the speed of the cutter is controllable on this particular machine from 20 to 500 r.p.m. The feed indicator dial is shown as the commentator defines feed as the number of inches per minute which the table moves the work into the cutter. The film closes with a series of views of surface milling, straddle milling, gear cutting and keyways as the commentary calls attention to the versatility, precision, and efficiency of the milling machine.

1 CUTTING A KEYWAY ON END OF A FINISHED SHAFT

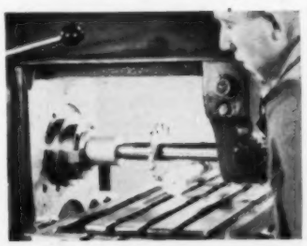
525 feet, 16mm. sound-on-film, Cost $12.37

This training motion picture shows in considerable detail the correct set-up for a rigid arbor assembly; the calculations and operations necessary to locate the work on the table for the cut; the calculation of the speed and feed in terms of type and size of cutter, and type of metal to be cut; and the use of the rapid traverses and power feeds. Animation, closeups photography, and commentary combine to demonstrate many of the basic principles of milling machine operation as they apply to the cutting of a keyway in a steel shaft.

Closeups of a blueprint show two keyways are to be cut, one at each end of a steel shaft. The shaft is located in the table slot nearest the head. A short arbor is selected and the cutter is located as near to the head of the machine as possible. The accompanying commentary stresses the importance of these locations to secure a rigid arbor assembly for precision work. Pictures and commentary combine to stress the importance of the cleanliness of the machine and the freedom of all parts from dirt and burrs. Animation and commentary show in considerable detail the calculations and the operations necessary to locate the piece for the required cut. Animation is used to show and to explain the calculation of the proper feed and speed for cutting a keyway in terms of the metallic composition of the cutter, the diameter of the cutter and the number of teeth, and the composition of the metal being cut.

The operator is shown setting the feed dial and the speed dial to the required positions. The table is set for the required depth of cut. The table stops are set for the length of cut and the cut is made. After the first keyway has been cut, the machine is re-set for the second keyway. Closeups and commentary are used to explain and demonstrate the hand feeding of the cutter to the correct depth on the second keyway. Once the correct depth of cut is reached, the automatic horizontal feed is thrown in and the cut completed. For this job the shaft has been fastened to the table by clamps and U-bolts. A brief series of views shows the same job being done with the shaft secured in a table vise and between the centers of the dividing head.

The film closes with a brief review of the important steps to be remembered and followed in operating a milling machine in the cutting of a keyway.



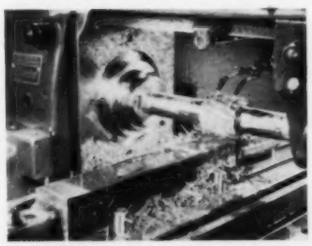
2 STRADDLE AND SURFACE MILLING TO CLOSE TOLERANCES

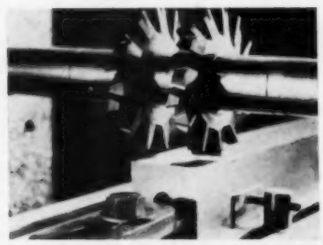
975 feet, 16mm. sound-on-film, Cost $22.12

This picture shows the set-up and the selection of cutters used when surface milling a solid block of steel on four sides and then straddle milling the block into a T-section, working to close tolerances. The piece is clamped to the table with finger clamps in each end.

The rough piece has previously been drilled in the end for the finger clamps and the operator's movements as he cleans the table and the piece and clamps the piece on the table, for the first slab milling cut, are shown. The piece is milled on all four sides, each movement of the operator being shown in detail and discussed in the commentary.

After the piece has been finished all over the slab milling cutter is removed and two side milling cutters and the necessary spacing collars are mounted on the arbor. The importance of a rigid arbor set-up is emphasized and the operator is shown as he takes a trial cut and finds that the spacing between the two cutters must be changed. The method of calculating the thickness of the two shims used and the manner in which they are placed on the arbor are shown in the pictures and discussed in the commentary. As the cutting proceeds, the operator checks the setting of the cutters to be sure the spacing is correct. At the completion of the cut he again measures his work and checks with the drawing to be sure it is correct. The film closes with a resume of all the various steps used.





3 STRADDLE MILLING . . . .

625 feet, 16mm. sound-on-film, Cost $14.37

This film shows the sequence of operations used when machining the sides of two connecting rods held on a fixture mounted on a table of a No. 2 plain milling machine.

Mounting the fixture on a table; clamping the two pieces in the fixture; calculating the length of various spacing collars to be used with the four cutters; the use of four side milling cutters with spacing collars of a given length, the necessity for a rigid arbor set up and the procedure used when making same; lining up the work held in the fixture with the cutters on the arbor; calculation of feed and speed are all discussed in detail both in the pictures and in the commentary.

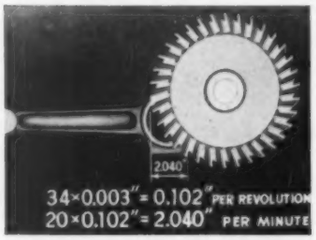
Both the table and the base of the fixture are cleaned and the fixture mounted on the table. The fixture is rotated 180 degrees for each operation and is locked in these positions by a dowel pin. The two connecting rods are mounted in the fixture and the table moved up

close to the face of the column. Closeup views showing the cutters mounted on the arbor and the manner in which the arbor supports are bolted in place are clearly shown. The method used to calculate the length of the spacing collars, both for locating the cutters on the shaft and for the correct spacing between the cutters are shown in animation. A setting gage, held in a fixture, is used to align the fixture with the cutters, both for longitudinal and vertical position.

Calculating the speed of the cutters in feet per minute and the feed of the table in inches per minute are clearly shown. A trial cut is taken and the two pieces measured to check the spacing between the cutters.

The use of shims for correcting the distance between the cutters is demonstrated. Commentary is used throughout, discussing the various operations as they proceed and stressing safety precautions. The picture closes with a resume, both in pictures and in commentary, of the various operations depicted in the film.

THE MILLING MACHINE



4 PLAIN INDEXING AND CUTTING A SPUR GEAR . . . .

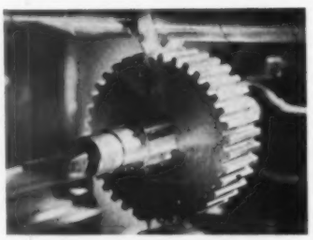
925 feet, 16mm. sound-on-film. Cost $21.12

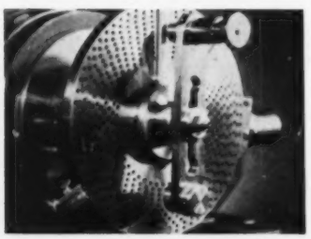
This training motion picture offers an explanation and definition of diametral pitch, and the parts of a gear tooth; detailed explanation of the use of the dividing head for spacing teeth and the operations of a milling machine in the cutting of a spur gear.

Animation combined with commentary names the parts of the gear tooth and explains diametral pitch. The proper cutter is selected, and placed on the arbor. Closeups show the placing of the gear blank on a mandrel and then between the centers of the dividing head.

There is provided in animation a detailed explanation of the principles of the dividing head and the manner in which it is used to secure the desired number of cuts. The use of indexing plates and of the sector on the indexing plates is explained. The operation of the dividing head to secure 36 evenly spaced cuts on a gear blank is demonstrated.

On this particular job the accuracy of the indexing is checked by making a series of preliminary nicks or slight cuts in the gear blank. The work is supported with the table jack, the depth of the first cut is calculated, and the table stops are located for the desired length of cut.





A brief sequence of animation serves to review the calculation of the speeds and feeds necessary for this cut.

The roughing cut is completed for the entire gear blank and it is checked. A second, or finishing cut is then made. The finished gear is checked with a gear tooth vernier. The motion picture closes with views reviewing the important points in cutting a gear blank and using the dividing head. The commentary stresses the necessity for a constant check of the work and the accuracy needed in the correct cutting of the gear.

VERTICAL BORING MILL

1 ROUGH FACING, TURNING AND DRILLING ON A VERTICAL TURRET LATHE . . . .

1125 feet, 16mm. sound-on-film. Cost $25.12

This training motion picture emphasizes the identification of the various controls on a standard vertical turret lathe; the use of these controls in making facing, turning, and drilling cuts with the vertical head; demonstrates the independent and universal movements of the chuck jaws on the table; the method of holding a piece by internal chucking and the use of the indexes on the machine to control the movement of the cutting tools. The job selected for this machine demonstration is an aluminum casting for a diffuser section of a modern airplane engine.

The film opens with a finished job as rough facing, turning, and drilling cuts are identified. Closeups of a typical operation sheet combined with commentary, explain that these operation sheets are typical of production jobs and serve to guide the operator. The machine is cleaned and oiled and the operator is safely dressed. The accompanying commentary explains that these things are assumed on every job. The work is to be held by the jaws of the combination chuck on the table. The independent and universal movements of these jaws and the procedures used in internal chucking are demonstrated. The importance of the procedures used in centering the casting and securing it firmly to the table are explained.

The movement of the vertical head up and down and cross-wise by power and by hand are demonstrated and the levers and wheels which control these movements are identified. Attention is called to the indexes on the vertical and transverse feeds and the correct procedures for using both the power and the hand feeds. The turret on the main or vertical head is explained in considerable detail by closeups and commentary as the operator mounts the roughing tool for the first rough facing cut. Animation explains the feed of the cutting tool on the machine. The facing cut is started, checked, corrected, and continued until completed. The turret head is indexed and closeups show the setting of the turning tool. The vertical head is brought into position, the table is started, and the turning cut made. The vertical head is centered by the centering rod and a drill is set in the turret for drilling. Throughout the entire film the correct and safe procedures to be followed in the operation of the machine are stressed by closeups and commentary. The motion picture closes with a brief review of the important points to be remembered in the performance of work on the vertical boring mill and vertical turret lathe.

2 ROUGH FACING AND BORING AND TURNING A SHOULDER . . . .

800 feet, 16mm. sound-on-film. Cost $17.87

This motion picture reviews the operation of the vertical head; portrays in considerable detail the parts and the operation of the horizontal or side head; depicts the procedures used in holding work on the table with clamps and driving block; and demonstrates the operations used in making rough facing, boring, and turning cuts with the independent use of the main and side head. An aluminum casting of an airplane motor part is used for this demonstration.

The casting is fastened to the table by means of clamps and U-bolts. It is centered and leveled by means of a dummy indicator and a surface gage. The controls and the movements of the vertical head are reviewed as the tool is mounted in the vertical head for the facing cut. A boring bar is mounted and a boring cut made. The shoulder is turned by means of a tool mounted in the side head. The vertical and horizontal movements of this head are explained and demonstrated and the machine controls that control these movements are identified. The use of reference clippings on the index dials of the hand feed wheels is demonstrated and explained in terms of setting up the machine for production work. Animation explains the determination of the depth of cuts on the diameter. Considerable emphasis is given to the use of the automatic horizontal and vertical feeds on the main and side heads.

The film closes with a brief review of the principles involved in the operation of the vertical turret lathe.

3 FACING, TURNING, BORING, GROOVING, CHAMFERING ON A VERTICAL TURRET LATHE USING 2 HEADS . .

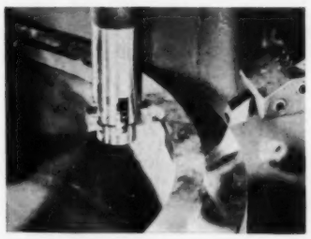
1125 feet, 16mm. sound-on-film. Cost $25.12

This motion picture demonstrates facing, turning, boring, grooving, and chamfering cuts on a vertical turret lathe with the simultaneous use of both heads, the securing of work in a special fixture, the precautions to be observed in machining magnesium alloys, and the use of a surface gage and test indicator for leveling and centering the work. The job selected for this demonstration is a semi-finished magnesium alloy casting, prepared by the lay-out department.

The use of special fixtures in securing castings to the table and the use of test indicator to check the setting are demonstrated. The vertical head is used to face the casting. The correct tools are selected and mounted in the vertical and side head for simultaneous use in making the boring and turning cut. The correct operation of the vertical and side head is depicted in considerable detail and the parts and controls of each are reviewed. The use of a flush pin gage to determine the depth of cut on a shoulder is shown and animation explains the use of a chamfering tool. Closeups, animation, and commentary show the correct use of a grooving tool and explain the calculation necessary to locate correctly the grooving cut.

The safety precautions necessary in working with magnesium alloys are emphasized in a brief sequence demonstrating the explosive action of burning magnesium chips when water is thrown on them. The accompanying commentary emphasizes the constant need for buckets of sand when working with magnesium. The use of reference clips and the order of setting the tools in the index head are explained in terms of "tooling up" the machine for production work.

The film closes with a brief review of the important features of the vertical turret lathe and the principles involved in its safe and efficient operation.

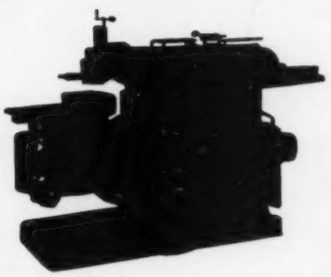


The Complete Set of Three Subjects on
THE VERTICAL BORING MILL Costs $68.11

Total Footage, 3050 feet, 16mm. sound-on-film
All prices include reel and can

(Individual titles may be purchased separately)

THE SHAPER



Footage and cost of this subject on same basis as previous reels

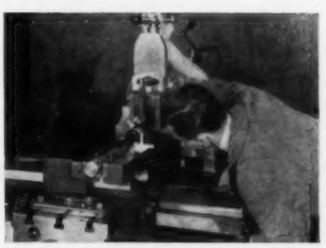
1 CUTTING KEYWAYS . . . .

This subject demonstrates the operation of a shaper in cutting a keyway in a steel shaft, emphasizes the safety precautions necessary in the operation of this machine, explains the clearance hole at the end of a cut, portrays the selection of the tool and its setting for a given width and depth of cut, shows the correct procedures for securing the work in a table vise, and the selection and procedures used in setting the correct length, position, and speed of the ram stroke.

Animation combined with commentary and closeups of the blueprint show the steps followed when laying off the keyway at the end of a steel shaft. The use of an indicator to check and to make certain that the solid jaw of the table vise is parallel with the stroke of the ram is demonstrated in considerable detail.

The operator places the shaft in the vise on a parallel and sets it in the correct position for cutting the keyway. A roughing tool with a cutting surface smaller than the keyway is selected as the commentary explains that a roughing cut will be made first. The tool is squared with a parallel and securely mounted in the tool post. The ram is set for the proper length of stroke, and then adjusted to make certain that the end of the stroke comes in the middle of the clearance hole at the end of the keyway. The importance of this position is explained by closeups and commentary. The correct cutting speed in terms of the cutting tool and the metal being cut is selected and machine is set. As the roughing cut proceeds, the necessity for keeping the clearance hole free of chips is explained. When the roughing cut has been completed, a finishing tool is selected that is the full width of the keyway. $\frac{1}{64}$th inch has been left for the finishing cut on both sides of the keyway. The speed, the length of the stroke, and the position of the stroke are checked. Attention is called to the necessity for wearing goggles in the performance of this work. The tool is hand fed to the work approximately .002 inch per stroke. Emphasis is given to the feeding of the tool on the back stroke. As the finishing cut approaches the lines in the layout, the machine is stopped and the dimensions of the cut checked with the blueprint.

The film closes with a brief review, emphasizing the proper setting of the tool, securing of the work, setting of the ram stroke, speed and position, as the commentary emphasizes the necessity of each of these in the safe and efficient operation of a shaper.



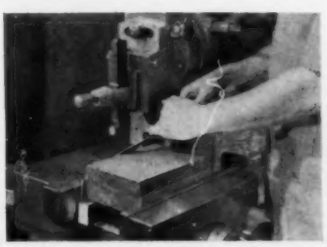
2 MACHINING A RECTANGULAR CAST IRON BLOCK

Footage and cost of this subject on same basis as previous reels

This motion picture demonstrates the procedures followed when rough machining and finish machining a rectangular block of metal held in a vise mounted on the table of the machine. In this picture a block of cast iron is used to show how the work is held in the vise, the functions and use of parallels and the various ways in which the block is set in the vise for rough machining all six surfaces. It demonstrates also the techniques used when taking finishing cuts including the use of tell-tale papers to assure the correct seating of the piece on the parallels, the necessity for establishing a reference surface and setting the piece in the vise so that all the other surfaces will be machined from that reference surface.

The difference in the shape of the roughing and finishing tools and the method of setting each, together with the depth of cut, and the use of the automatic feed, and hand feeding, are shown. Various safety precautions such as the use of goggles, keeping the hands out of the way of the tool, running the table off to one side when setting the work in the vise, and the necessity for keeping the vise clear of chips, are emphasized. Setting the ram for length and position of stroke and the use of the vertical hand feed screw in the head are shown in detail.

The cutting speed, feed, and depth of cut are shown in animation. The commentary, which flows along with the picture is used to explain and emphasize the various principles underlying each operation shown and to explain why certain operations are performed in a given manner. The film closes with a series of montage shots with lap dissolves giving a resume of the various basic principles and operations discussed in the picture.



3 MACHINING A TOOL STEEL V BLOCK

This film shows in detail the machining of a V-block from a solid piece of tool steel which is held in a shaper vise. The piece has previously been finish machined all over ready for cutting the V's and the clamping slots on the sides. The use of paper shims to assure the correct seating on the parallel, setting the ram for length and position of stroke, are shown in detail. The selection of each tool used on the various operations is discussed, both in the pictures and the commentary, and the correct procedures followed when setting each tool for its particular job, are also emphasized, both in the pictures and the commentary.

Cutting the slots on the sides is done with only one cut and the reason for this procedure is given. One method of roughing cut the large V and the small V on the opposite side, working to the layout, are shown in full detail. Selecting the finishing tool for these operations, setting the head of the shaper over to cut to a 45 degree angle, and setting the finishing tool for the finishing cuts are clearly shown. The position of the head on the ram is not changed when machining the two sides of the V, instead the head remains in one position and the piece is reversed in the vise.

Footage and cost of this subject on same basis as previous reels

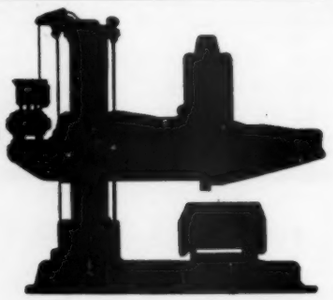
The necessity for using all precautions necessary to keep the vise clear of chips and the effect which chips may have on the accuracy of the work are emphasized. The necessity for removing burrs and breaking sharp corners as a safety precaution both for the work itself and for persons handling the piece after it has been machined are very strongly emphasized together with the necessity for exercising care when setting up the work in the vise to eliminate some of the various hazards to the operator.

The film closes with a series of montage shots giving a resume of the various steps covered in the picture.

The Complete Series Includes
THREE SUBJECTS ON THE SHAPER

Total footage and cost of the series is computed on same basis as previous reels

THE RADIAL DRILL

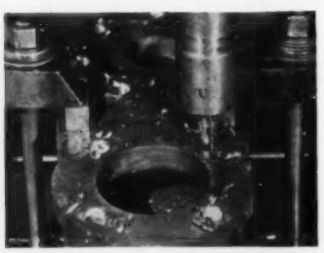


1 DRILLING AND TAPPING A CAST STEEL VALVE BODY

This picture shows the techniques used when drilling and tapping blind holes in cast steel on a radial drill. A drill jig with loose bushings is used for locating the holes.

Throughout the picture, the various controls of the machine are pointed out and the method of using each demonstrated. The necessity for keeping both work and machine clean is emphasized. Setting up the work on the table of the machine, setting the jig on the piece to the layout lines, and clamping the work in place on the table are shown in considerable detail.

Calculating the size of the tap drill is shown and the method used when setting the machine to drill a number of holes to the same depth is demonstrated. A wizard drill chuck is used in the drilling operation and a standard friction chuck is used for holding the tap. The action of a tap in a hole is shown in animation as is also the reason why a tap binds in the hole and must be reversed frequently when tapping in tough metals. The necessity for having the work securely clamped on the table when tapping is emphasized



Footage and cost of this subject on same basis as previous reels

together with other safety precautions affecting the operator, the machine, and the work.

Commentary is used at each step to reinforce the pictures and give reasons why certain things are done in certain ways as well as calling attention to the basic principles underlying each operation.

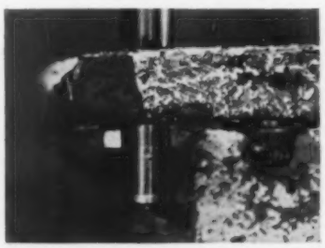
The picture closes with a series of shots giving a resume of the various points covered, together with a discussion by commentary.

2 DRILLING AND SPOTFACING A CAST IRON VALVE BODY

This picture shows in detail the techniques used when drilling to a layout and spot facing the under side of a flange. The method of mounting the work on the table and the necessity for clamping it securely in place are shown in detail. Two small table jacks are used to hold the piece in position.

The layout of the various holes showing the prick punch marks on the center lines are shown on the surface of the casting. The drill is started on one of these layouts and test spot is drilled. Examination shows it is badly off center and the technique used in drawing it over to the center of the layout is demonstrated both by photography and by animation. The reasons why the drill often starts off center and the basic reasons underlying the various techniques used in drawing it back on center are discussed in the commentary.

After the drilling has been completed a plain spot-facing bar is placed in the spindle of the machine, the bar is lowered into one of the holes in the casting and a fly cutter is clamped in the bar on the under side of the flange. There are extreme closeups showing both the bar and the fly cutter separately and afterwards



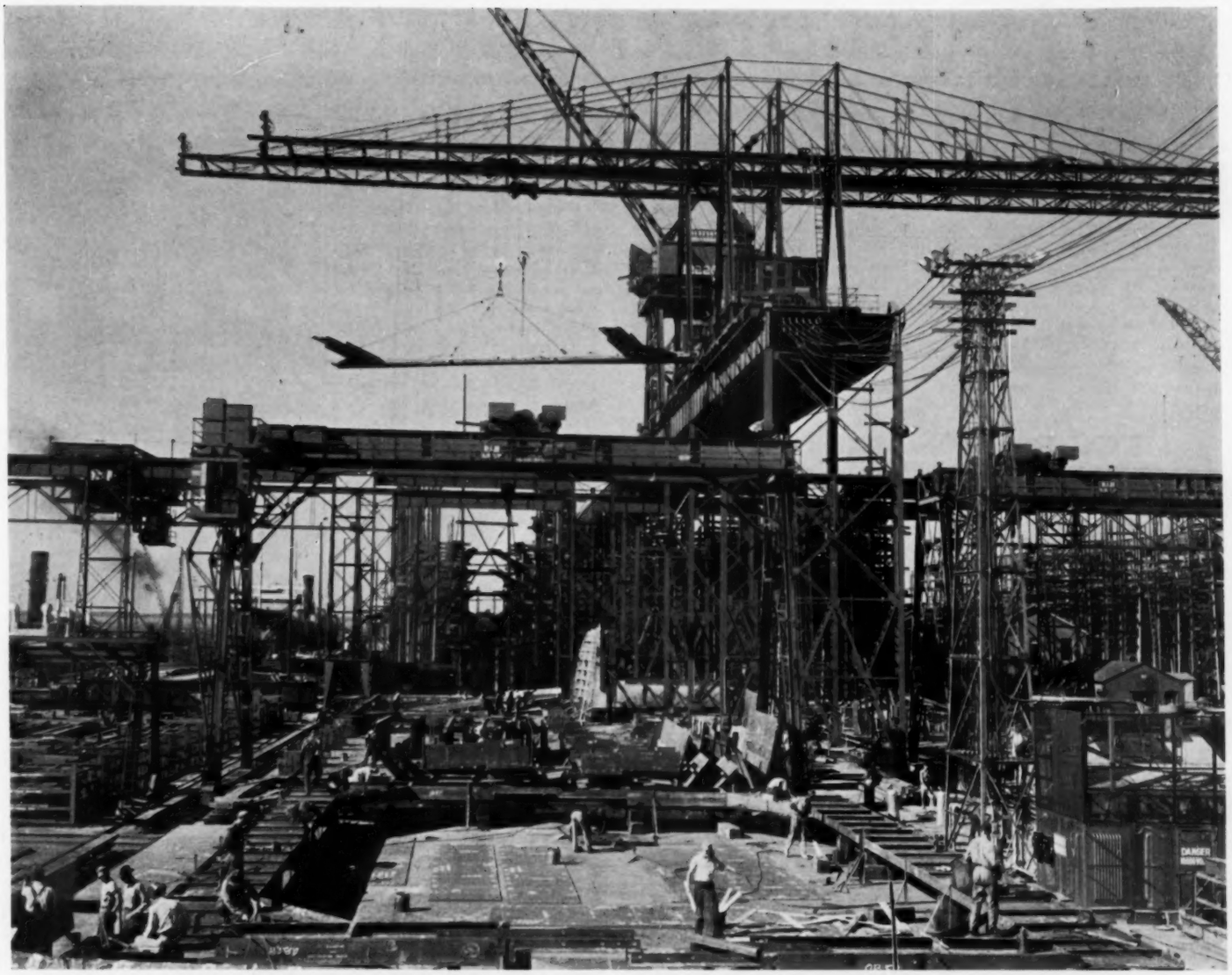
Footage and cost of this subject on same basis as previous reels

in the actual operation of spot facing the under side of the flange. The operator is shown as he measures the thickness of the flange after it has been spot faced and sets the stop on the machine for controlling the movement of the spindle when spot facing the succeeding holes.

Commentary is used throughout in a discussion of the basic reasons underlying each step in the operations as well as for calling attention to various safety precautions that must be used. The film closes with a series of shots giving a resume of all the steps shown in the picture.

The Complete Series Includes
TWO SUBJECTS ON THE RADIAL DRILL

Total footage and cost is computed on same basis as previous reels



Visual Aids in Shipbuilding

BY A. F. Johnson, *Coordinator of Shipbuilding, U. S. Maritime Commission*

MUSHROOM growth of existing shipyards and creation of new yards under experienced management are making possible the building of large merchant and naval fleets today. Five years ago there was very little shipbuilding.

A nucleus of experienced ship artisans is training an army of novices who must work in new and constantly changing environments.

To show these learners how the structure and equipment of a vessel are produced and assembled, without interference of related trades and in proper sequence, would be impracticable on the vessel itself. These learners would get in the way of productive workers. The proper kind of motion pictures with essential tasks enacted by skilled men and presented in proper sequence, with supplementary animation and commentary, can be used repeatedly and most quickly to instruct beginners away from the job and with least delay in production.

They rapidly convey the knowledge of assembly steps, nomenclature, part identification, markings, and supplementary erection procedures, with equal clearness to all learners and with the same opportunities for comprehension.

They also show skilled manipulation which young apprentices may imitate to their advantage. No other process of visual training can so vividly portray the complete story of producing and erecting typical ship's parts. Nor is it possible to put the student into so many related shop or field environments with little time loss.

The pictures serve an introductory, a review, and a corrective purpose. They permit, if necessary, the breaking down of complete shipbuilding trades into their component skills. This emergency policy may be necessary and justified as the shipbuilding pace accelerates.

SHIPBUILDING SKILLS

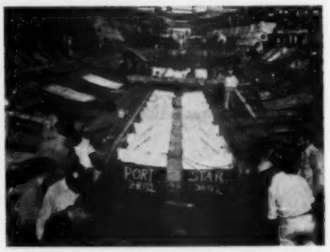
1 PREPARING AND SETTING A KEEL BLOCK AND BOTTOM CRADLE

This training motion picture presents in detail an explanation of the basic lines used in ship construction: base line, center line, water line, buttock line, frame lines; and explanation and definition of declivity angle, port and starboard, athwartships, and fore and aft; a demonstration of the setting of the keel block to the center line and proper declivity angle and the marking off and setting of a spaul from a template mold.

Animated diagrams are used to define and explain keel track and bottom cradle, and to show their relationship to the ship itself. Detailed animation combined with commentary explains base line, center line, water line, buttock lines, and frame lines, showing their relationship to each other and presenting them as planes which bisect the ship and assist in the easy, quick, and accurate location of every part on the ship.

Animation, combined with actual photographs and commentary, explains declivity and demonstrates the use of the declivity board and spirit level in the construction of the keel track and the setting of a keel block.

An explanation is given of the function of side spauls and the method used in laying off and setting a spur spaul. Such knacks as using a broad axe and adze and using the chalk line are portrayed. Animation is combined with commentary to explain the turning over of the spaul template for laying off both port and starboard spauls from the same template. Throughout the entire presentation there is a constant emphasis on the relation between the blueprint symbols, the workings on the steel parts and the lines defined in the opening sequence.



Visualizing Begins at the Keel

2 INNERBOTTOM SECTION: SUB-ASSEMBLY OF A CLOSED FLOOR SUB-ASSEMBLY OF A SOLID FLOOR

This training motion picture deals largely with the work of the shipfitter; defining vertical keel, flat keel, keelson, floors, stiffener, baffle plate, and universal mold; explaining the role of these elements of the ship construction in strenghtening the ship; and demonstrating the laying off of the closed floor from a template, locating and fitting a vertical stiffener, a flat bar ring for lightening hole, and a face plate.

An explanation of the inner bottom section and the role it plays in ship construction is followed by a detailed explanation of the location, kinds, and purposes of floors. The job of fitting a floor starts with a template. This is clamped to the steel plate and the shipfitter punches the necessary marks. Commentary and closeups combine to show and explain the different kinds of punch marks and their meaning. In the course of preparing this floor there is an explanation of port and starboard and their relationship to the proper laying off from a template and universal mold.

Constantly, the picture, animation, and commentary combine to show the relationship between the blueprint, the template, and the floor. A rather detailed explanation of hidden lines is given.

Locating, setting, and fitting a T-bar stiffener and tack welding it in position is demonstrated. The setting and fitting of flat bar face plates on the snipe and of a flat bar ring stiffener or chock in the lightening hole are demonstrated.

The purpose of these basic elements in ship construction and the role they play in ship construction is explained as the operations are shown.

Progression of a Double Bottom

3 INNERBOTTOM SECTION: SETTING UP AND FITTING FLOOR

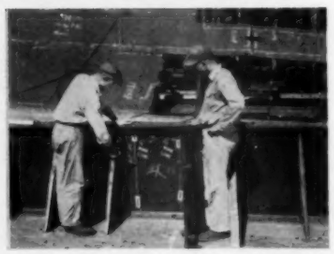
This training motion picture deals with the cooperative work of shipfitter and shipwright in setting and fitting a closed floor in an innerbottom section. It provides an explanation and definition of keel, longitudinal side girders, floors, fairing, and declivity; shows the fairing, setting, and fitting of a floor in an innerbottom section and demonstrates the procedures used in checking the declivity angle, the use of wedges and spur shores, the use of bar and turn buckles to align the keel and emphasizes the use of the blueprint in all shipbuilding work.

A detailed explanation of the innerbottom section and its various parts introduces the setting, fitting, and fairing of a transverse watertight floor. The job starts with checking with the blueprint and checking the alignment of the vertical keel. The use of a spirit level shows that the keel is not absolutely vertical. The wright's helper drives up a spur shore with wedges until the keel is in vertical alignment. A declivity board and spirit level are used to check the keel and indicates that it is too high at the fore end. Flat bar and turn buckles are clipped to the keel and used to pull the keel down against the keel block. The vertical keel is checked for a considerable length and at another point must be raised. The wedges used in the nearest section of the keel track are driven in to raise the keel block and the keel the proper height. The accompanying commentary explains the reasons and calls attention to the safety measures necessary in this work, and defines this aligning of the keel as fairing.

The center line and the frame lines are struck. Markings on the solid floor locate it at Frame Station 98, and the floor is brought into position.

Next, a longitudinal side girder is located and set in the inner-bottom. The accompanying commentary explains the blueprint marks or symbols transferred to the longitudinal and their use in locating the position for it. The shipwright fairs the longitudinal with the use of a straightedge and a spirit level. Spur shores and wedges are used to raise the floor and girder. Blueprint symbols on the floor are explained as the chipper bevels, the edge of the plate. A dog and a wedge are used to bring the end of the longitudinal in alignment and the welder is shown tack welding the butt seam. The accompanying commentary emphasizes the safety precautions necessary in this operation.

A strongback is tack welded in position to hold the plates in correct alignment for a production weld. A transverse floor has been set, fitted, and faired by the shipwright and shipfitter working together to the blueprint.



On a Ship Floors are Vertical!

4 DECK GIRDER: SUB-ASSEMBLY

This training motion picture portrays the work of the shipfitter in sub-assembling a deck girder. This demonstration gives considerable emphasis to the necessity for proper understanding and correct reading of the blueprint in order to lay out and fit a deck girder accurately, the purpose of a deck girder, the operations necessary to fit filler and tilting brackets.

A view of a ship under construction showing the deck girders in place provides a basis for an explanation of deck girders; what they are, where they are located, and their purpose in a ship.

The task of fitting a deck girder starts with checking with the blueprint. This is a transverse deck girder to be made up from a split end T-bar with a filler bracket in the web of the split end. A dog is used to guide the filler bracket into perfect alignment for tack welding. A key bracket is fitted to the other end of the girder.

Since this is a transverse girder, the shipfitter locates with punch marks and marks the center line and the buttock lines. The blueprint calls for a doubler on the web of the girder. Dogs are used to hold the edges of the doubler from buckling as it is tack welded. Holes are located and the doubler is riveted to the web of the girder. The accompanying commentary explains the use of rivets for this job. Closeups show the use of the hammer in testing the tightness of the rivet. A tilting bracket is then fitted. The film closes with a view of the transverse girder swinging into position in a ship under construction.

Driving High Tensile Rivets

5 SIDE FRAME: SUB-ASSEMBLY OF A WEB FRAME

This subject presents in considerable detail the work of a shipfitter in sub-assembling a side frame. Views of a ship model, combined with animation, serve to show and explain the smooth tapering surface of a streamlined hull and the role of side frames in holding the ship in shape. A detailed explanation is given of the reversing of templates in laying off pairs of frames. Attention is called to the fact that where unusual pressure and strain are to be counteracted the web frame is used.

Closeups show the placing of a template on a steel plate, the scribing and the punching of the lines from the template to the steel plate, locating stiffeners giving the shape of the web frame, and marking the water and buttock lines. Lightening holes, stringer cutouts, and pipe openings are also located and punch marked.

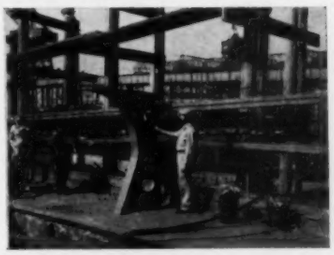
There is a detailed explanation by picture and by animation, combined with commentary, of the need for reversing templates when making a pair of such web frames. The role of the buttock line and water line in locating parts of the web frame are indicated and explained. Also, the use of frame numbers, water lines, and buttock lines in locating the web frame in the ship is explained. The water lines and buttock lines are chalked and back marked on the web frame. The use of copper batting strips in butt welding the web to the frame is demonstrated. The blueprint calls for a flat bar face plate. The center line of the face plate is located. Guide nuts are tack welded to the face plate at the work lines. The face plate is then dogged in the proper position and tack welded. A lightening hole is located and cut and a flat bar ring stiffener is fitted in the lightening hole. The commentary explains the reason for these lightening holes and the use of the flat bar ring stiffener. The film closes with pictures and commentary emphasizing the role of the blueprint in all jobs of the shipfitter.

Tack Welding a Bracket

6 GIRDERS: SETTING A TRANSVERSE WEB FRAME AND A HORN GIRDER

This training motion picture shows the work of the shipfitter and shipwright working together setting a web frame and horn girder. Considerable emphasis is given to laying off of center lines, frame lines, and buttock lines on the deck of the ship, fitting and setting the horn girder in terms of these lines, the various procedures used to shift the girder up and down, over and crosswise and to the definition of such words as camber, wooden batten, and spiel line. The job starts with the drawing showing and animated arrows explaining the location of web frames and deck beams, and illustrating and defining camber. The parts of the web frame which support this deck beam and the various holes that have been cut in each are named and explained. Throughout the entire process considerable emphasis is given to constant checking with the blueprint. Closeups show the punch marks which indicate the location of the center line and the wright striking the center line on the deck of the ship. The accompanying commentary emphasizes the necessity for absolute accuracy in striking this line and explains why it is desirable to mark each line. The resulting squares that are formed are checked by the 6-8-10 system for absolute squareness. Closeups show the wright beginning his measurement at the 1-foot mark on the tape line as the commentary explains that this practice makes for greater accuracy.

The frame line, the 28-foot buttock line, and the 24-foot water line are pointed out and their relationship to the setting and fitting of the girder explained. The web frame is lowered to the deck of the ship with the use of erection ribbands. The various symbols marked on the web frame are pointed out and explained. The declivity on the alignment on the web frame are carefully checked with the spirit level and declivity board. The use of a wooden batten in determining the amount of excess metal to be removed are demonstrated. The lines are marked, the excess metal is cut, the alignment is checked and this time the web frame fits. The spur shores needed to receive the deck beam and to adjust it to position for proper setting, are sawed and drilled. As the deck beam is swung by the crane, spur shores are bolted to it. Wedges under the shores enable the wright to raise or lower the deck beam or to shift it sideways as it is necessary. The center line and the declivity of the beam are checked with the plumb bob and the declivity board. The plumb bob shows that the deck beam is properly centered, ready for the shipfitter.



A Web Frame Is Set and Fitted

7 BULKHEAD: LAYING OFF THE BOUNDARY AND STIFFENERS ON A TRANSVERSE WATERTIGHT BULKHEAD

This picture depicts the work of the shipfitter necessary to lay out the boundary and stiffener on a transverse watertight bulkhead. Considerable emphasis is given to a definition and explanation of base line, center line, water line, and buttock line; showing how these lines are located and chalked on the bulkhead; demonstrating the knacks used to make certain that the lines are "square"; and showing the use of templates to lay off stiffeners and other markings.

The job starts with a check with the blueprint. The bulkhead is to be 24 feet high and 48 feet wide. Animation, combined with commentary, is used to locate and explain the starboard and the port side, buttock lines, and water lines. Templates are used to locate the center line, buttock line, water lines, and stiffener lines. The great care necessary to locate the center lines properly is shown and emphasized by a series of extreme closeups. The water lines and buttock lines are then struck and their squareness is checked by making certain that both diagonals of the same square are the same length. This method of checking squareness and the necessity for such constant checks are emphasized and explained by pictures and commentary. The bulkhead is now shown with the 4-foot buttock lines and the 4-foot water lines combined with the center lines to form 4-foot squares.

Templates are now fastened to the bulkhead with mold loft clamps, care being taken that the water lines and buttock line on the templates, line up with those laid off on the bulkhead. To make certain that the templates remain in proper position, they are dogged down. A soap stone is used to mark the edge of the template and thus to indicate the excess trim. Closeups and commentary are used to emphasize the need for accuracy in this marking and the necessity for following all the edges in notches and angles. Soap stone marks are then center punched. Later these lines will serve as a guide for the burner.

Using the templates, the location of the stiffeners is punch marked. When the templates are removed, circles are painted around these punch marks to assist the shiplifter in locating them later. Considerable emphasis is given in picture and commentary to the general practice of making the template for the starboard side of the ship and then turning them over to lay off the portside. The portside of the bulkhead is now laid off and punch marked in the same fashion. The templates are removed, the punch marks are circled with paint, and the fitter strikes the stiffener lines. The use of dogs and wedges in flattening a bulged portion of the bulkhead to secure a flat fit of a T-bar stiffener is demonstrated. The technique used in chipping a weld to secure a close fit of a stiffener is shown. The film closes with a view of the entire bulkhead dogged down, laid off, and fitted with stiffeners.

Laying Out the Bulkhead

8 BULKHEAD: LAYING OFF AND FITTING A CENTERLINE STIFFENER

This motion picture deals primarily with the work of the shipfitter in laying off and setting a center line T-bar stiffener to a water-tight bulkhead. This subject gives considerable emphasis to the advance planning of the work in terms of the most economical cutting of the T-bar stiffener and tripping bracket from an I-beam; the laying off of stiffener and brackets from templates; and the necessity for constant checking with the blueprint on the part of the shipfitter.

An introductory sequence locates and gives the importance of bulkhead and explains the use of the center line stiffeners. The job starts with an examination of the blueprint and on the basis of this information, the shipfitter plans his work step by step. A T-bar center line stiffener is to be cut with a tripping bracket from an I-beam quickly and with a minimum wastage of material. Closeups of the blueprint indicate the size of

T-bar stiffener, combined with views of the I-beam and commentary explaining the planning of the work. The template is aligned to the beam, the water line, and edge of the template is punch marked on the beam itself. Chalk lines are struck for the center line and the cutting line.

A brief sequence shows a cutting machine cutting the I-beam. The template is placed on the T-bar thus formed. The water lines are marked on the web and flange. Commentary stresses the necessity for accuracy in this work in relation to the proper fitting of the stiffener to the bulkhead and the bulkhead to the hull.

On this particular job, a tripping bracket is to be used. This will be cut from the remaining portion of the I-beam. Again a template is used. A punch marks the flange lines with 1-inch of material left for fitting. The lines for the tripping bracket are marked on the beam as the commentary calls attention to the skill needed in back marking the edges of the flange. Marking the 4-8-12 16-20-and-24 foot water lines follow on the T-bar stiffener. The bracket has been cut and the tripping bracket is fitted on the end of the main bracket.

The next task is that of fitting the center line stiffener to the bulkhead. Closeups call attention to the perfect alignment between the water lines on the stiffener and those on the bulkhead as the commentary stresses the importance of this alignment. To assist in securing this necessary alignment a flat bar is welded to the bulkhead. The stiffener is now tackwelded to the bulkhead by the shipfitter ready for production welding.

Close Measuring to Speed Victory

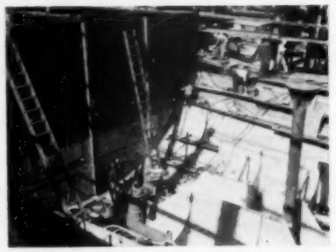
9 BULKHEAD: SETTING A TRANSVERSE WATERTIGHT BULKHEAD INTO HULL

This subject demonstrates the work of the shipwright in setting and fairing a watertight bulkhead into a hull. Considerable emphasis is given to the location of the center line, frame lines and buttock lines on the hull of the ship, the alignment of the same lines on the bulkhead to the hull lines, the technics used in shifting the bulkhead to bring it into the correct position, and the shoring of the bulkhead in position for fitting.

The film opens with views of a bulkhead in position as the commentary calls attention to the importance of such bulkheads in strengthening the ship transversely. An overview of the entire job of setting the bulkhead is given by a series of views in miniature.

The shipwright and his assistants first strike the center line and buttock lines on the innerbottom of the hull. Views of this work show the steps by which the wright locates the center line, the frame line, and the buttock lines and strikes them on the innerbottom. Closeups show the marking of these lines with punches. The 3-4-5 method is demonstrated to check the 'squareness' of the frame line with the center line. Closeups show the location of the work line as the commentary explains the purpose and use of this line.

The bulkhead already subassembled on the skids is lowered into the hull. The commentary calls attention to the ribbands that are necessary to keep the bulkhead 'fair' during the process. There follows a detailed series of views demonstrating the methods by which the shipwright moves the bulkhead, over, sidewise, and vertically in order to get it into the correct position. Closeups combined with animation and commentary call attention to the use of spur shores and wedges, steamboat jacks and hydraulic jacks to shift the bulkhead into position. Closeups show the exact alignment of the lines on the bulkhead with those previously marked off on the hull. The position of the bulkhead is checked with a plumb bob held at the center line. There follows a detailed explanation by picture and commentary of the procedures used in checking the bulkhead for the correct declivity angle. These checks show that the bottom of the bulkhead needs trimming. A wooden batten is used to mark the bulkhead for the trimming



Watertight Bulkhead in Position

The bulkhead is now dropped into its position. The film closes with a series of views showing the bulkhead being checked for correct alignment and being found correct.

10 DECK PLATES: REGULATING AND SETTING

This film shows the work of the shipfitter and the shipwright in setting, fairing, regulating, and fitting, the deck plates of a ship. Emphasis is given to procedures used by the shipwright in setting and aligning deck plates, the work of the shipfitter in regulating and fitting the plates in their position, the use of a steamboat jack and angle bar clips and bolts for moving the plates are demonstrated.

Animation, combined with the views of a model and commentary are used to show the location and the purpose of decks in a ship. The internal bracing that underlies each deck and the purpose of the deck plates in strengthening the ship transversely are explained. Animation, combined with closeup views show the work of the shipwright in locating and chalking the center line. Animation is also used to explain the placing of deck plates in rows or strakes outboard from the center line. Each strake of plates must be located with exact reference to the center or buttock line marked on the ship and on the plate itself. Closeups show the shipwright locating these lines and chalking them on the transverse deck beam. Plates are swung into position by a crane on top of the deck girders.

This particular deck has milled scarphs to make flush points at the butt joints and side seams. Closeups combined with animation and commentary explain the use of steamboat jacks and ratchet and angle bar clips and bolts to draw the plates into exact position for welding. Closeups show the root opening as the commentary explains the purpose of this opening in making the necessary welds. Each strake of plates is checked by the shipfitter and the shipwright before it is tack welded into position. Closeups and commentary show the use of liner wedges, dogs, and flat bar fairing strips to provide flush joints for welding. The shipfitter checks the fit of each strake of plates, the deck beams and girder. Closeups show the use of a clamp and bolt to bring the plate squarely on top the deck girder. A testing knife is used to check the steel to steel fit.

The use of the strongback to straighten a plate bent or buckled during welding is shown in considerable detail. Bolts are tack-welded to the plate, the strongback is set over the bolts and the plate is straightened. The root opening on the seam is gaged and the plate brought flush for welding.

The film closes with a brief review of the important points of the work of the shipfitter and the shipwright in regulating, fairing, setting, and fitting deck plates.

Footages and cost of the individual titles above as well as the complete series of

TEN SUBJECTS ON SHIPBUILDING SKILLS

are on the same basis as previous reels reviewed

(Individual titles may be purchased) (All prices include the reel and can)

SPECIAL NOTICE

★ Vocational schools and colleges which are conducting courses for defense workers under the provisions of Public Law 146, 77th Congress, in cooperation with the U. S. Office of Education may purchase instructional materials including books and visual aids when such material can be shown by the school or college to be necessary for the instruction in courses approved under the provisions of the law.

CONTRIBUTING PRODUCERS of the VICTORY TRAINING FILMS

★ *The films on Precision Measurement were produced by* **LOUCKS & NORLING STUDIOS**

★ *Films on the Engine Lathe and Shipbuilding (5) were produced by* **THE JAM HANDY ORGANIZATION**

★ *Films on the Milling Machine and Shipbuilding (5) were produced by* **CARAVEL FILMS, INC.**

★ *The films on the Vertical Boring Mill were produced by* **AUDIO PRODUCTIONS, INC.**

★ *The films on the Shaper and the Radial Drill were produced by* **EMERSON YORKE STUDIOS**

Further films in this series will be produced by the Calvin Company, Ray-Bell Films, Inc., and West Coast Sound Studios (N. Y.)

THE NATIONAL DISTRIBUTOR AND SOURCES

★ In order to secure as widespread and inexpensive distribution of these motion pictures, as quickly as possible, it was decided to award the distribution of the program on a contract basis. Castle Films, 30 Rockefeller Plaza, New York City, was awarded a contract by the Procurement Division of the Department of the Treasury, for the printing and distribution of these motion pictures. The prices quoted for each individual films are the prices at which that film may be purchased. Castle Films is utilizing the services of thousands of audio-visual dealers and representatives throughout the entire United States to distribute the films to schools and industry.

Committees & Individuals Aiding the Training Film Program

The program of training motion picture production of the U. S. Office of Education of the Federal Security Agency, was planned in its broader aspects by an Office of Education Committee consisting of the following individuals:

C. F. Klinefelter, *Chairman*

W. M. Arnold J. R. Coxen R. W. Hambrook L. S. Hawkins Allen W. Horton E. L. Kirchner W. P. Loomis C. E. Rakestraw S. M. Ransopher Tom Watson

F. E. Brooker, *Director, Visual Aids* J. W. Barritt, *Technical Consultant*

★ Many other people and organizations have cooperated in the production of these films, advising on the technical content and organization, checking the accuracy and soundness of the teaching procedures portrayed, making certain that difficult teaching problems were covered, and in many instances, assisting in securing the necessary accessory jigs, fixtures, and the like required for the motion pictures.

The following have given freely of their time and experience in the production program:

E. F. Allen, Head Shipfitter, *Newport News Shipbuilding and Dry Dock Co.*

William Ash, Head Moldloftsman, *Newport News Shipbuilding and Dry Dock Co.*

J. W. Baker, Principal, *Dobbins Vocational School, Philadelphia, Pennsylvania*

R. R. Barr, Coordinator, *Mastbaum Vocational School, Philadelphia, Pennsylvania*

Ward J. Beckstead, Instructor, *Manual High Vocational School, Kansas City, Kansas*

Earl L. Bedell, Director, *Vocational Education, Detroit, Michigan*

George W. Bent, Hull Superintendent, *Newport News Shipbuilding and Dry Dock Co.*

Robert D. Berg, Teacher of Machine Shop, *Central High School, St. Paul, Minnesota*

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A. S. Boynton, State Director, *Vocational Education, Hartford, Connecticut*

Frank P. Bradley, Assistant Supervisor for Promotion, *State Department of Education, Hartford, Connecticut*

W. E. Brunton, Assistant Director for National Defense Training, *Philadelphia, Pennsylvania*

C. A. Chauncey, Teacher of Machine Shop Practice, *Dobbins Vocational School, Philadelphia, Pennsylvania*

Captain Herford T. Cowling, Army Air Corps, War Department

C. C. Crawford, Supervisor, *National Defense Program, Detroit, Michigan*

H. W. Dahlor, State Supervisor, *in Charge of National Defense Training, Jefferson City, Missouri*

Peter Dross, Instructor, *Paterson Vocational School, Paterson, New Jersey*

Lt. William Exton, Jr., *Office of Public Relations, Navy Department*

Leon E. Falgren, Director of Industrial Education, *Kansas City, Kansas*

J. Ed. Galbraith, Machine Shop Instructor, *Manual High and Vocational School, Kansas City, Kansas*

John Gaillard, Mechanical Engineer, *American Standards Association, New York, New York*

J. T. Garman, Director, *Division of Visual Education, Philadelphia, Pennsylvania*

H. F. Garyantes, Head Shipwright, *Newport News Shipbuilding and Dry Dock Co.*

Mr. Geske, Department of Education, *St. Paul, Minnesota*

M. A. Gimbel, Safety Engineering and Personnel, *General Electric Company, Philadelphia, Pa.*

Vincent Gourley, Center Supervisor of National Defense, *Detroit, Michigan*

William J. Hargest, Associate Editor, *The American Machinist*

Herbert D. Hall, President, *The Herbert D. Hall Foundation, Newark, New Jersey*

R. W. Hartmann, Area Coordinator in Industrial Education, *State Department of Public Instruction, Philadelphia*

S. R. Hickey, Assistant Supervisor of Training, *Newport News Shipbuilding and Dry Dock Co.*

Richard W. Howes, Assistant Supervisor, *Trade and Industrial Education, Hartford, Connecticut*

Dr. A. F. Johnson, Coordinator of Shipbuilding, *U. S. Maritime Commission, Washington, D. C.*

Carl E. Karlstrom, Supervisor of Vocational Education, *Detroit Public Schools, Detroit, Michigan*

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H. E. Linsley, Wright Aeronautical Corporation, *Paterson, New Jersey*

Fred Lutz, Business Representative, *Machinist's Union, St. Paul, Minnesota*

H. E. Madden, Coordinator, *Bok Vocational School, Philadelphia, Pennsylvania*

James F. Mason, Director, *Paterson Vocational School, Paterson, New Jersey*

Lt. M. H. Mertz, Motion Picture Project, Bureau of Aeronautics, Navy Department

C. W. Moeller, Gage Sales Department, Pratt and Whitney Division, *Giles Bement and Pond Co., West Hartford, Connecticut*

Frank Mueller, in Charge of Gage Inspection, Pratt and Whitney Aircraft, *East Hartford, Connecticut*

Raymond V. Nord, Supervisor, Defense Training for Out-of-School Youth, *East High School, Minneapolis, Minnesota*

Louis Nusbaum, Associate Superintendent, *School District of Philadelphia, Philadelphia, Pennsylvania*

Lt. Thomas Orchard, Bureau of Aeronautics, Photography Section, *Bureau of Aeronautics, Navy Department*

S. J. Perkins, State Supervisor, National Defense for New Jersey, *Elizabeth, New Jersey*

George Piggott, Director, National Defense Training, for New York City, *Brooklyn, New York*

W. W. Renshaw, Coordinator, *Mastbaum Vocational School, Philadelphia, Pennsylvania*

Thomas Reynolds, Acting Head, Vocational Department, *Northeastern High School, Detroit, Michigan*

Harry G. Schmid, Acting Director, *Vocational Training Department, St. Paul, Minnesota*

Herman Schumacher, Assistant Director in Charge of the Instructional Program for National Defense, *Detroit, Michigan*

Charles Sehl, District Business Agent, *International Association of Machinists, Philadelphia*

Mr. Sommers, Department of Education, *St. Paul, Minnesota*

O. P. Stamstad, Assistant Supervisor, *Kansas City, Kansas*

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R. O. Turpin, Shop Foreman, *Fairfax District, Kansas City, Missouri*

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Visual aids for Victory

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Kit-set Number 1

(Principles and Operation of Auto Assembly Units)

Kit. A. **The Fundamentals of the Internal Combustion Gasoline Engine** (8 slidefilms)
Kit B. **Principles of Power Transmission** (6 slidefilms)
Kit C. **Mobility Factors** (10 slidefilms)
Kit D. **Electrical System** (6 slidefilms)
Kit E. **General Service** (5 slidefilms)

AUTO. MECHANICS' TRAINING
Kit-set Number 2

(Care and Repair of Passenger Cars and Trucks)

Kit. A. **Servicing the Engine Assembly** (7 slidefilms)
Kit B. **Servicing the Power Transmission Units** (8 slidefilms)
Kit C. **Servicing the Mobility Factors** (11 slidefilms)
Kit D. **Servicing the Electrical System** (3 slidefilms)
Kit E. **General Service and Sheet Metal Work** (6 slidefilms)

TEACHER TRAINING
Good Teaching Kit-set

1. **The Teacher**—Personal characteristics: appearance, bearing, habits, gestures, speech, and attitude.
2. **Some Principles of Learning**—To show that the purpose of the teacher is to help shorten the learning process.
3. **I Want To Learn**—How course information replaces nondescript material in the student's mind.
4. **The Lesson Plan**—How daily class becomes a complete unit. Motivation. Student participation.
5. **Make Your Chalk Talk**—Talking to the eye of the student. How to draw on board, how to learn free-hand sketching. Values of chalk pictures.
6. **Teaching a Vocation**—Learning through doing. Safety precautions in vocational classes.
7. **Shop Teaching**—Preparation of shop lessons; how to talk to a shop class. How to demonstrate.
8. **Designing Examinations (Part I)**—Value of examinations. How to test student's understanding of course.
9. **Designing Examinations (Part II)**—Cont. Part I. Emphasis on formulation of multiple choice, true and false, and similar **objective** type tests.

MACHINING

A new series of educational slidefilms covering **Machine Tools, Techniques, Measurements and Measuring, Drill Presses, Grinding Wheels, Lathes, Milling & Surfacing, Shapers, etc.** will be available in February. They comprise a basic introduction to machining—designed to assist the teacher in putting across the basic information in a machining course.

ELECTRICAL EDUCATION
Electricity Kit-set

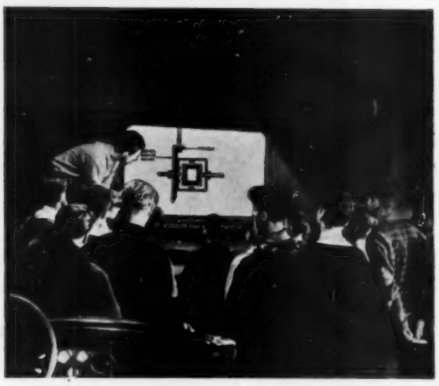
1. **Magnetism**—The general properties and laws of magnets. Magnetic effects.
2. **Static Electricity**—The electron theory of positive and negative charges.
3. **Current Electricity**—Laws of current flow in the various types of circuits.
1. **The Electric Cell**—The change of chemical energy into electrical energy. Primary and secondary cells.
5. **The Storage Battery**—The construction and use of the commercial storage battery.
6. **Electromagnetism**—Construction and use of the electromagnet. Effects of the electromagnetic field.
7. **The Generator**—Principles of the generator. Types. Generating direct and alternating current.)
8. **Alternating Current**—Inductance, capacitance, and impedance in a circuit. Transformers & rectifiers.
9. **Electric Motors**—Principles of the Motor. Direct and alternating current motors. Universal motors.
10. **Electric Meters**—Construction and operation of various types of meters for electrical use.
11. **Applications**—Heating and lighting.
12. **Applications**—Solenoids, motor uses, radio, etc.

What Is a Kit-set?

Slidefilm Kit-sets are a series of individual slidefilms (film strips or filmslides) covering various phases of a subject. They are attractively packaged in a carrying case containing a permanent space for each slidefilm and an index for quick reference.

Sound-on-Film Motion Pictures

"Giving a Shop Demonstration" — **"Factory Safety"** (Industrial Safety)—**"A Safe Day"** (Industrial Safety)—**"Filing"** — **"Riveting"** — **"Aircraft Welding"** — **"Tips for Teachers"** — **"Behind the Shop Drawing"** — **"Automotive Mechanical Training** (16 subjects) **"Passing the Know-How Along"** (Training Within Industry) (Silentfilm).



PILOT TRAINING

(A film training course based on the official ground school material of the Civilian Pilot Training Program and checked and approved by the Civilian Pilot Training Service of the Civil Aeronautics Administration).

Individual Kits:

KIT I
"Men and Wings"
"Todays Wings"
"Aircraft Regulations"
"The Pilot"
"Traffic"
"Radio and Control"

KIT II
"Lift and Drag"
"Wing Forces"
"Stability"
"Plane Performance"
"Check and Double Check"
"The Airplane Engine"
"Fuel and Feed"
"Engine Instruments"
"Parachutes"

KIT III
"The Air Ocean"
"Air Masses"
"Weather"
"Air Pilotage"
"Dead Reckoning"
"Airway Aids"
"Flight Instruments"
"Pilot Problems"

AIRCRAFT TRAINING
Basic Aircraft Metal Skills

1. **Slotted Anchor Plate**—Layout Work, Hack Sawing, Filing and Drilling.
2. **Internally Threading a Plate**—Drilling and Tapping Procedure.
3. **Making a Stud**—Using a Thread Cutting Die.
4. **Extracting a Broken Stud**—Using a Screw Extractor.
5. **Hinge Fitting**—(Proper Procedure in Making Bent Fitting.
6. **Grinding and Sharpening**—Using a Bench Grinder.
7. **Making and Drilling Riveted Patch**—Layout, Cutting and Drilling.
8. **Hand and Pneumatic Riveting**—Methods and Cautions in Riveting.
9. **Removing Rivets**—Correct Removal Technique.
10. **Flanger Parts—Tray (Part I)**—Base and Sides. Procedure and Tools for Forming Aluminum.
11. **Flanger and Parts—Tray (Part 2**—Angles and Assembly. How to Form Angles and Assemble Formed Parts.

Other Aviation Training Slidefilms: Rib Stitching; Fabric Repair; Properties of Metal, I & II; Inspection Before Fabric Covering; Covering With Fabric; Hand Tools for Fabric Work; Spray Painting Equipment; Protection of Metals, I & II; Refueling; Fabrication of Tubing; Cable Splicing I & II; Mixing & Using Casein Glue; Repairing; Sheet Metal Surfaces; and Soldering.

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AMERICA TRAINS

(*Continued from Page* 12)

munities throughout the rural districts of the United States. At the present time there are 46,080 youths enrolled in these courses. During the past year 349,700 youths have been enrolled in this program. These courses for rural youth are designed to provide a knowledge of occupational nomenclature, shop practices and industrial materials and to develop natural skills in the use of tools in the field which the training is given. Trainees who have taken these courses form a pool of potential industrial workers who with additional specific training will be prepared for employment in occupations essential to defense or the training may assist them in the operation and maintenance of mechanical equipment in the field of agriculture which is now assuming great importance.

The need for increasing certain agricultural products is necessitating a change in courses which originally were of an industrial character to one with an agricultural complex. The outbreak of war will require the speeding up of this change in the character of this program. During the next year emphasis on this program will be more on occupations essential to agriculture than on industry. In order to make this program more effective it will be necessary to open this type of training to all agricultural workers regardless of age.

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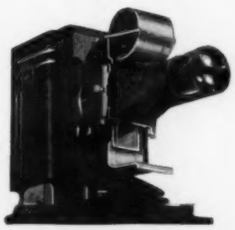

S.V.E. TRI-PURPOSE PROJECTOR MODEL AAA

This unit shows single or double frame filmstrips and 2" x 2" slides. Its 300-watt lamp and fast 5-inch anastigmat lens have ample illumination for auditorium use. It is furnished complete with lamp, lens, semi-automatic vertical slide changer, and leatherette carrying case.

S.V.E. PROJECTOR MODEL G For Showing Only Slidefilms

has 300-watt lamp, 4-inch objective lens, film rewind take-up, and carrying case.

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S.V.E. SINGLE-FRAME SLIDEFILM PROJECTORS FORM A PART OF ALL LEADING SOUND-SLIDEFILM UNITS

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THE FIRST STEP, in stepping up production in your all-out victory effort, is to **speed up** the training of new men for your new tools and machines.

Group instruction with slidefilms is the answer. These convenient **35mm. filmstrips** have proved their efficiency in schools and industries over a period of 20 years. They are economical and can be made quickly for your particular requirements by any film-producing studio. In this connection, many companies, as well as U. S. Government departments, use **full-color 2" x 2" Kodachrome slides** with black and white slidefilms to further emphasize important points. There are also employee-training slidefilms already available, such as the **S.V.E. Picturols** on vocational training and electric welding.

S.V.E. Projectors for showing slidefilms and 2" x 2" Kodachrome slides are made in styles and sizes from 100 to 300 watts for every projection requirement. The fine optical system in S.V.E. equipment assures **maximum screen illumination** and **sharp definition.** S.V.E. Projectors are light in weight and easy to carry and have many other features that make for **convenient operation.** They also fully protect film from heat and from scratching. Because of their proved superiority, S.V.E. Projectors have been standard equipment in all leading sound-slidefilm units for many years. Ask your producer-dealer about these finer projectors. Also ask about S.V.E. Defense-Training Picturols. For full details write Dept. 12B.

SOCIETY FOR VISUAL EDUCATION, INC.

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NEW TOOLS of INSTRUCTION

—producing the Victory Training films

● THESE MOTION PICTURES were made to assist teachers who are charged with the task of training the men needed in the defense industries. Little needs to be said about the staggering proportions of this task. The problem of defense is essentially a problem of production and the problem of production, to a considerable degree, is a problem of securing the skilled men necessary to maintain it and to increase it. To have more tanks, more planes, more guns, and more ships we must have more men, trained in the production of tanks, planes, guns and ships.

TRAINING METHODS UNCHANGED

The methods by which these implements of modern warfare are produced have changed greatly in the last decade, but the ways by which we train the men who produce these implements have changed but little in a hundred years. The development of motion pictures specifically designed to assist instructors is an endeavor to apply to the problems of training the techniques of motion picture presentation. These techniques have proved their effectiveness in other areas of use.

The utilization of motion pictures in education and more specifically, in training, is not as new as is generally supposed. Large industrial concerns have for many years had a definite program of motion pictures and allied visual aids to assist them in the training of men who were necessary to the successful carrying on of their business. Foreign nations, such as England, Germany, Russia, France have for many years developed films and used them extensively in the training of men and women. An interesting sidelight on this fact is that in 1939 Germany, with half the population, had four times as many sound 16mm. projectors as the United States and more than five times as many motion pictures specifically designed for instruction.

ARMY AN EARLY PIONEER

The U. S. Army, during World War I, developed some 117 films specifically designed for the instruction of the armed forces. These films cover such things as aerial map reading, the operation of the Stokes mortar, and the correct use of the Y-gun. It is a logical development that with the increased mechanization of modern warfare, the Army should in World War II, embark on an even more intensive and concentrated use of motion pictures for the training of men. The Navy likewise has a program of motion picture production for use in training.

Nor is the success of motion pictures wholly a matter of conjecture. In addition to the experience provided by commercial concerns, foreign nations and the armed forces there is the experience provided by the public schools. Well authenticated research carried on by some of the leading educators of the country indicate that motion pictures are some 30% more effective than traditional methods of instruction in putting across facts and their percentage of superiority is even greater when it comes to shifting attitudes and developing appreciations. The acceptance by teachers of motion pictures as teaching tools is indicated by the fact that in a national survey conducted as of January 1, 1936, only 453 sound 16mm. projectors were in the schools of the entire United States and a similar survey conducted as of January, 1930—four years later—indicates that there are better than 6,500 sound 16mm. projectors in the secondary schools alone.

OFFICE OF EDUCATION PROGRAM

Therefore, to assist in the training of men and of women, as such training becomes necessary, the United States Office of Education has engaged in the production of motion pictures and other visual aids. These are motion pictures specifically designed to utilize the techniques of the motion picture in clarifying, explaining, and demonstrating the basic principles of machine operation and other skilled work. They are high quality motion pictures made under the guidance of competent specialists experienced in every phase of machine shop and ship construction work. They are teaching films specifically designed for teaching, whose organization was checked by men experienced in the problems of teaching skills and who are familiar with the problems of motion picture presentation.

They are designed to help the instructor by providing a demonstration in which all students see equally well the intricate aspects of every job operation; by providing clarification of cutting tools; and by giving such motion picture techniques as animation, slow motion, and magnification to such things as basic principles of the micrometer, the calculation of speeds and feeds, the action of cutting tools; and by giving to the student an over-view of an entire job operation on a typical machine with a skilled explanation of the "whys and wherefores" of each operation as it is performed.

HELP UNDERSTANDING OF JOB

It is expected that these motion pictures will provide students with a basic familiarity and understanding of the job, the principles involved, and the manipulation required; that they will assist in the development of an appreciation of skill and precision that is required in the competent mass production of modern implements of warfare and that they will give the student a sense of familiarity with the physical operations that he must "ape" in order to do them himself. These presentations bring all the impact of a motion picture in a darkened room to emphasize the necessity for such things as safety, cleanliness, and good craftsmanship. They may be used in such instances as the motion picture "Fixed Gages" to familiarize students with tools that are not available in their own training situation.

CAN'T REPLACE INSTRUCTOR

These pictures are designed to assist instructors. They cannot take the place of the instructor any more than a machinist's handbook can take the machinist's place. But like the machinist's handbook, they have a place and will assist. They depict typical jobs on typical machines for the purpose of demonstrating and clarifying basic principles of

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WEST COAST'S
Up-to-date studio facilities and long experience in producing effective motion pictures for exacting clients, are at work in these war times. Helping to step-up the nation's industrial efficiency, West Coast Sound Studios, Inc., is producing Machine Shop Work training films for the United States Office of Education.
Let a West Coast Sound Movie be the BEGINNING of the END of your training problems.
TRAINING FOR VICTORY
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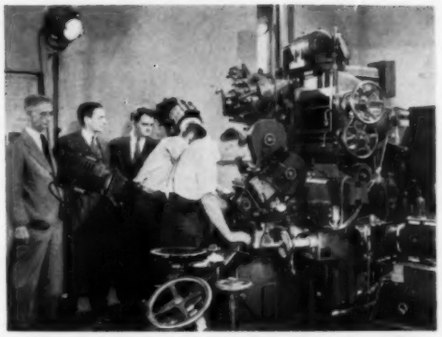


The complexities of a vertical boring mill are discussed by J. W. Barritt, technical consultant to the U. S. Office of Education (extreme left), Frank Speidell, of Audio Productions & Floyde E. Brooker, Director of Visual Aids for the Office of Education.

machine operation and ship construction. They cannot show all the various ways of doing various jobs, nor can they be expected to cover variations that exist from shop to shop, from industry to industry, and from machine to machine. It is expected that instructors will amplify and add to the information and content of these pictures in terms of their own training group and in terms of their own shop practice. These are motion pictures. They cannot take the place of actual practice on the machine. They may familiarize and provide information and an effective demonstration, but in the actual operation of any machine or in the actual performance of any job requiring skills, they cannot and are not expected to take the place of actual practice.

Technically Excellent

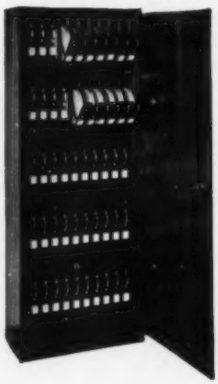
Photographically these are excellent motion pictures. They have been professionally made by some of the leading commercial film producers. Animation and closeups have been used extensively and expertly. The voice used for the commentary has been well selected. The commercial motion picture industry can well be proud of this series of motion pictures. For in these pictures the students at all times can see what he is supposed to see—hear what he is supposed to hear.

Experienced instructors who have seen these films and who have used them, indicate that if they are properly used, they will do the job for which they are intended—that of expediting defense training.

In the pages that follow, brief descriptions are given of those subjects that have been completed or will be completed and available for distribution by January 1. These descriptions are intended only as a catalogue to the pictures themselves. They should enable instructors to select the films in which they are most interested. But these descriptions are not intended and cannot take the place of seeing the motion pictures themselves.

Building the Training Library

● Vocational schools and apprentice classes in industry who are utilizing the invaluable visual aids provided in the U. S. Office of Education Victory Training program, will first look to the availability and condition of projection equipment. Then facilities for the storage of the entire 50-reel program (of which 30 are already available) must be provided for their projection and adequate humidification.



"Safe Model" Film Cabinet —has a capacity of 50 reels.

Primary supplier of such storage equipment as

* * *

The Neumade Junior Board provides two geared end rewinders on a 34" porcelain panel. A Griswold Jr. Splicer is in the center.

well as of editing equipment and other film handling supplies is Neumade Products Corporation of New York City. For this program, Neumade recommends the "Safe" model which provides storage facilities for 50—400 foot reels. Similar cabinets are available with 800, 1200 and 1600 foot reel capacity. All are made of heavy gauge steel and are both fire and dustproof.

Minimum editing equipment necessary for splicing and repairs would consist of the Neumade "junior" board which provides rewinder spools and a splicer, cement holder and applicator.

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For business use, a projection screen has to be RIGHT. It MUST be easy to set up and take down. It MUST give clear, sharp pictures. Radiant Automatic does both. Unequalled in automatic simplicity of operation, its "Hy-Flect" screen surface gives a perfect, clean-cut reproduction — with lifetime whiteness guaranteed.

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Whatever your need, Radiant has it.
Portable Tripod Screens in all sizes from 30x40 up to 70x94 inches.
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Scene from "Ski Revels"

Scene from "Ice Carnival"

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Filmosound Library offers thousands of Hollywood's finest "shorts" on 16mm. sound film—some of them in color. Prices and rental rates are moderate. Often these films tie up closely in subject matter with clients' business films. A few timely offerings:

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Ice Carnival. Figure skating and ice racing. Ensemble of more than 100 experts.

Snow Thrills. An omnibus of winter sports: skating, ice boating, dog-team racing, ski running and jumping, and bobsledding.

Bowling Aces. Tournament play. Demonstrations by champions. Amazing trick shots by Joe and Mike Falcaro and others. The unbelievable "vibration" shot.

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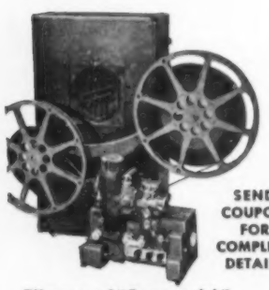

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( ) Please make recommendations for removing the handicaps which impair the value of our business film program. (Description of film, purpose, audience type, and present film distribution plans should accompany this request.)

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Bell and Howell

THESE NEW TRAINING FILMS

By J. W. Barritt,* Technical Consultant on Visual Aids, U. S. Office of Education

● THE FIRST TIME I saw one of these films, I thought "Gee! if I could have had something like this in my apprentice training work." A whole flock of memories wedged themselves into my mind. The time when a young apprentice forgot to keep the tailcenter on his lathe tight when taking a finishing cut on a gear blank. The gear was scrapped and the delivery of the unit it was made for was delayed two weeks.

The time when Sam got mixed in his reading of an angle and set the compound to the wrong degree. The time when the apprentice who was cutting a spur gear, got mixed in his figuring for the dividing head, and had half a tooth left over, when the cutting was done.

THOSE PAINFUL MEMORIES

Or the time when ——. Oh, well, let it go at that. Why take the time and energy to recall all these things: they are all too familiar and too painful to every instructor who has struggled with the problems of getting the students to comprehend the importance of such so-called unimportant details. The pictures are here now, to take the place of the old labored, tiring, and tiresome work at the blackboard, or with a pencil and paper at the machine, or perhaps with a piece of chalk on the floor, or on the side of a convenient casting. Those trials and failures of the past have now crystallized into a new tool that will help many instructors over those old teaching hurdles.

ANIMATION SPICES ACTION

Speeds, feeds, and cuts, on each machine; the care and operation of each machine; the various uses of every important part on each machine; the shape, care, and use of cutting tools; use of the micrometer; the vernier; and many others, are all shown in action on the screen; action spiced with animation.

Perhaps my feelings when I saw this first picture can best be realized if I tell you of the events leading up to the occasion of the showing. I had written the original drafts of this picture, together with others of the same, which Mr. Brooker had translated into motion picture parlance. In company with other men who, like myself, had spent all their lives in the machine shop, and long hours and much energy in explaining all these various things to the boys, the shooting script and the commentary had been gone over with a fine-toothed analysis and a critical viewpoint.

We had made certain that every movement in the picture, and every word in the commentary, was the right movement and the right word. Careful study of the original analysis had disclosed many things that should be shown in the pictures —so many that it was necessary to scatter them throughout several pictures. Therefore, certain ones were allocated to certain films.

WE BEGIN "SHOOTING"

Then the shooting began! Now don't get excited. The word "shooting" has no reference whatever to gun play, as it is often portrayed in our Hollywood movies, nor does it connote any accomplishments of our Navy gunners. It is simply one expression of many in the jargon of camera men.

There were many others in this specialized field: Shutters, doors, screens, kleigs, and what have you. And thus it went from day to day. Something new each day; something different; new problems coming up all the time; and the film was growing into something. I kept wondering all the time what it would be like, especially since I had been assured many times over that it would not be like anything I had ever imagined, when writing the original draft.

And so what? Finally the day came when we were to see the assembled rushes. I was so excited I could scarcely keep still, and there was an uneasy feeling in the pit of my stomach. "What will they be like" was the one question on my mind.

We were ushered into a brilliantly lighted room. Presently the room was dark, then the pictures began to come on the screen. I was electrified and amazed. What had seemed to be a prosaic piece of mechanism in the form of an engine lathe had, by the magical powers of the camera, and of light, been transformed into a thing of beauty with a glamour all its own, far removed from Hollywood.

IT'S ALL ON THE SCREEN

There were the movements of the operator, slow and deliberate, yet true to shop actions; one of my early experiences as an apprentice was unfolding before my own eyes; the voice of the commentator

* * *

* *Formerly Supervisor of Apprentices, Westinghouse Elec. & Mfg. Co.; author of "The Care & Operation of Machine Tools (John Hall-1927); "Machine Tool Operations." (A. T. S. 1940; 800 pp.)*

DuMont television camera in an advanced position, duly camouflaged, scouting for the headquarters' staff at the rear.

Home Training with Visual Aids

● Not so long ago a young man started as a private in the Signal Corps for $21.00 a month. Within a short time he was rated a Staff Sergeant at $72.00 a month—resulting from his knowledge of radio and electronics.

Investigation found he had gained considerable knowledge with the help of visual training. He had been supplied in his own home with a movie projector and numerous films which actually pictured the action of electricity in various circuits—one of the unique advantages of DeForest's Training, Inc.

As a result he had found the subject easier to understand. He had grasped it more quickly. In fact, it is unlikely he will ever forget the points put across by those interesting films. In addition, he was provided with clear, concise, loose-leaf material—plus "practical training" by means of working on actual Electronic equipment, also supplied for use in his home. This was followed by additional practical training on larger items of commercial equipment in the Chicago laboratories of this training organization.

The world-shaking events of the past two years dramatically reveal that radio and electronics are now almost as necessary to military success as guns and powder. Radio makes possible communication between ships and planes, planes and tanks, tanks and infantry, submarines and their bases.

Even the military possibilities of the spectacular new development of Television are receiving serious consideration. Not long ago, experiments were conducted with a fully-equipped mobile television unit during one of the large war games. The experiment was hailed a success, as a camouflaged television camera "picked up" scenes of the invading "Blacks" and relayed them back to defense headquarters.

Television, radio and sound motion pictures are all a part of the timely training opportunity made possible by DeForest's Training, Inc. Organizations such as this one are truly contributing a real service to our great military program. Today, as in the past, training remains one of the foundations of national strength.

came clear and smooth, giving the why's and wherefore's of every movement.

And as the completed picture unfolded, the thought came to me, "Here is something that will help solve those old problems of instruction: Here is a *new* tool for the instructors; here is something that will answer the prayers of thousands of instructors who have wrestled with these teaching problems for years.

These films will not supplant the instructor, but on the other hand, should be regarded as another tool to be used in their instruction work. As a matter of fact, they will offer a wide field in which the instructor must exercise his ingenuity to the utmost to use the films to the greatest advantage.

Any readers interested in preparing for and getting started toward a career in Radio, Television and Sound Motion Pictures, may obtain additional information by addressing their request to BUSINESS SCREEN, 20 North Wacker Drive, Chicago, Ill.

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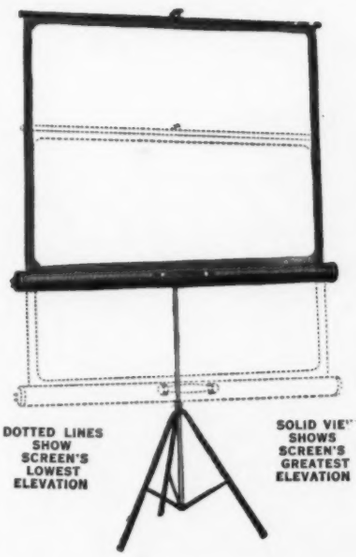

Assure the success of your motion pictures and slide films with a Raven Screen. Tell your story the way you planned in brilliant "life-true" terms. Because the screen is a vital part of your complete program it must be suited to your individual needs. Only Raven's variety of screen fabrics and screen mountings offer you that choice. For color—Raven Halftone cannot be matched. Eastman Kodak selected it from among all others for their Cavalcade of Color. Raven Witelite, Raven Beaded and other Raven fabrics offer the finest reproduction qualities for every type of commercial and educational film. Before you buy your next screen consult your dealer. See which Raven Screen is best suited for you. In fact, "in dollar and cents" logic, even though you do use another screen, it may pay you to see a Raven right now.

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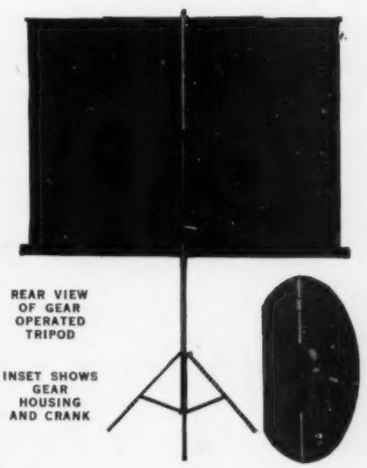
and many others from coast to coast.



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Directed by JOHN J. BOLAND

FILMS ON ELECTRICITY

● IMPORTANT in many phases of the defense production program, electrical maintenance and repair is an excellent subject for the employment of visual aids. Many good films have been prepared, some by commercial sponsors, others of a definitely educational character by professional producers who offer them at modest sale and rental prices noted in this list.

A complete index to such visual materials, including motion pictures and filmstrips, will be published in the next issue of Business Screen. A list of representative electrical subjects follows:

TYPICAL ELECTRICITY TITLES

CURRENTS INDUCED. *Motion picture film*, 16mm. silent. 1 reel. Eastman Kodak Co., Rochester, N. Y., $24.00. The principle of electromagnetic induction applied to commercial generators—the conversion of alternating current into direct current—the action of the commutator, transformer, telephone, etc.

ELECTRICITY. *Slide-films* (12). 35mm. The Jam Handy Organization, Michigan, Individual slide-films, $4.50. (*See page* 28).

ELECTRICITY, CHEMICAL EFFECTS OF. *Motion picture film.* 16mm. *silent.* 1 reel. Eastman Kodak Co., Rochester, N. Y., $24.50. The action of two electrodes in an electrolyte is traced from crude beginnings by Volta, through modern battery manufacture and use, etc.

ELECTRICITY, HEAT AND LIGHT FROM. *Motion picture film.* 16mm. *silent.* 1 reel. Eastman Kodak Co., Rochester, N. Y., $24.00.

ELECTRICITY, MAGNETIC EFFECTS OF. *Motion picture film.* 16mm. *silent.* 1 reel. Eastman Kodak Co., Rochester, N. Y., $24.00. Includes magnetism and magnetic induction, with their applications to the electro-magnet, the electric bell, the ammeter, the voltmeter, and the motor.

EXCURSIONS IN SCIENCE. *Motion picture film.* 1 reel, 16mm., sound. General Electric Co. (Write nearest branch office); free loan, transportation charge.

FILM LESSONS IN ELECTRICITY. *Motion picture films.* 16mm. sound or silent. 6 films, each 2 reels. DeVry Films and Laboratories, 1111 Armitage Ave., Chicago, Ill., rental each subject (2 reels), sound $3.00; silent $2.50 for each two days plus transportation both ways; purchase price each subject (2 reels) sound $63.00; silent $43.00. Subject covered:

1. *Principles of magnetism*
2. *Principles of Electro-magnetism*
3. *Principles of current electricity*
4. *Principles of electrical measurement*
5. *Principles of electrostatics*
6. *Principles of current generation*

HOW THE G-E ICING UNIT WORKS. *Motion picture film.* 16mm. silent. 2 reels. General Electric Co. (Write nearest branch office), free loan, (transportation charge).

MODERN SWITCHGEAR FOR GENERAL INDUSTRIAL USE. *Motion picture film.* 16mm. 2 reels, sound, General Electric Co. (Write nearest branch office). Free loan (transportation charge). A picture showing the importance of up-to-date switchgear in maintaining industrial production schedules.

MODERN ZEUS, A. *Motion picture film.* 16mm. sound. 1 reel. General Electric Co. (Write nearest branch office). Free loan (transportation charge). Pictures the production of artificial lighting and the devices used to protect electric power systems and domestic services from lightning.

QUALITY MOTORS IN THE MAKING. *Motion picture film* 16mm. sound. 1 reel. The General Electric Co. (Write nearest branch office). Free loan, (except transportation charge).

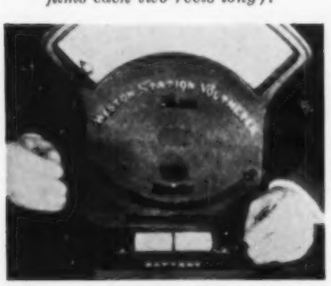
VOLT COMES INTO ITS OWN, THE. *Motion picture film.* 16mm. sound. 2 reels. General Electric Co. (Write nearest branch office). Free loan transportation charge.

WHEN YOU CAN MEASURE. *Motion picture film.* 16mm. sound. 4 reels. General Electric Co. (Write nearest branch office). Free loan, transportation charge.

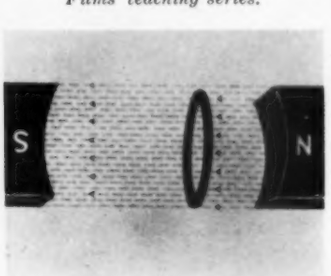
WHY WE DO IT THE WAY WE DO. *Motion picture film.* 16mm. sound. 4 reels. General Electric Co. (Write nearest branch office). Free loan, transportation charge.

EDITOR'S NOTE: According to the needs of local vocational classes, the titles above *may* be obtained through public funds provided for defense instructional materials, allocated at the discretion of state vocational authorities and *subject to such approval*, according to the provisions of Public Law, 146.

Reading the voltmeter is depicted in a DeVry Film reel from that Company's film lessons in electricity (6 films each two reels long).



Diagramatic animation helps unveil the mysteries of electricity in a typical scene from one of the DeVry Films' teaching series.



A MODEL TRAINING SETUP

by James F. Engle, Visual Advisor, Illinois Institute of Technology

● An important part of any engineering curriculum is the act of doing or seeing done the things which have been studied. This important phase of training was gradually being taken away in the early Spring of 1941. By this I mean field trips or plant trips were being curtailed due to an increasing amount of defense work. This loss of practical application necessitated our turning to the only other means by which we could bring the student in contact with this important phase of his work—the motion picture or slide. We, therefore, obtained a projector and began to search for suitable material, pictures which would fit in with our "stepped up" type of training.

Program Is Extended

After a thorough study of the available film and slide catalogs we finally obtained a small assortment of so-called "educational" films and started a visual education program. We soon found that even though a film was called "educational" it had no place in our program due to the fact that we were pressed for time and the majority of the films reviewed were not of a technical enough nature to warrant showing them to our students. We then instigated an exhaustive search throughout the country for strictly technical films and slides. After months of this work we compiled a list of films which we feel have great technical bearing on engineering work and placed them in a catalog for the use of our instructors. We deleted many very fine films from our list due to the fact that they did not stress the important steps in a given procedure, or they contained too much commercial advertising. Because our time is so limited in the various courses offered it is necessary to show only those films which will impart the most knowledge to our students in the least possible time.

During our quest for films on the topic of inspection we found that there was very little material available. We therefore asked our instructors to aid us in gathering together all the material which they felt was of value in the teaching of this particular subject, with the result that we now own a very elaborate set of 2x2 slides completely covering the inspection field.

Our visual education program has grown from an "if and when" proposition to the point where we now publish weekly programs of pictures covering all phases of engineering including the following:

Advanced Tool Design, Introduction to Tool Design, Elementary Mechanics and Machine Design, Machine Design, Strength of Materials, ASTM Testing Methods, Inspection in Quality Control, Welding Engineering, Concrete Testing, Diesel Engine Theory, Time and Motion Study, Advanced Production Methods, Industrial Training Methods, Industrial Management for Foremen, Metallurgy, Metallography, Plastics, Electricity, Advanced Radio Theory and Practice, Introduction to Electronics and Communications, Piping Systems, Introduction to Chemical Engineering, Explosives, Testing of Materials, Safety Engineering, Personnel Selection and Training, Cost Estimating, Foundry Engineering, and Maintenance Engineering.

These films and slides are available for showing in the defense training classes of the two branches of Illinois Institute of Technology, and in a number of plants in this area which have "Training Within Industry" programs. After compiling our "Motion Picture and Slide Films Directory" we found that we had upwards of 250 films and slides dealing with all phases of engineering, with new sources coming in every day. Supplementary sheets of new topics are issued monthly.

Reach 5,000 Students

Our visual education program has grown from serving the needs of 1,089 students in the first Engineering Defense Training program to an organization with a personnel of at least 10 people, 11 projectors, screens, facilities for rewinding, splicing and viewing films and a good start on a film library of our own which is now available to the 5,000 students enrolled in the current Engineering, Science, and Management Defense Training program. After these students have viewed a film or set of slides they are required to write a resume of what they have seen, and the gratifying results obtained have gone a long way in making these intensive training programs possible.

The people who have helped to make this program possible are the manufacturing concerns and those foresighted enough to appreciate the value of visual education in this country who so generously offered us the use of their films and slides. They are to be highly commended for doing their part in the National Victory Program as they have helped make possible one of the most economical visual education programs in the country.

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"With public sentiment nothing can fail; without public sentiment nothing can succeed. Consequently he who moulds public sentiment goes deeper than he who enacts statutes or pronounces decisions."

—Abraham Lincoln

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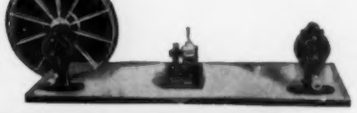

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For listings on this page address inquiries to Service Bureau of Business Screen, 20 N. Wacker, Chicago.

BUSINESS SCREEN'S INDEX OF PRODUCTION

WASHINGTON NEWSREEL

(Continued from Page Six)

immediate limit. There is a constant demand for films to amplify other training among partially skilled workers already employed in defense industries. These training facilities presumably are supplied directly by the Office of Education, and by Army, Navy, by the Training-in-Industry Section of OPM, and by other parts of OPM, OEM, and other Emergency units.

Army and Navy and Marine Corps will use the Office of Education films in growing numbers. All already are using some of the Office of Education films. They find these films exactly what the Doctor prescribed for some of their technical training purposes. Army and Navy are, and increasingly will be, the greatest users of such films. To understand the reason it is necessary to grasp that Army is striving to train every solitary soldier in some skill.

The old idea of the soldier who performed all the tedious jobs of the casual laborer when he enlisted is no longer valid. The Army has adopted the current European theory that the soldier is a fighting man, a caste apart as a fighting man; and since modern warfare is fundamentally and in detail a matter of machines and techniques, a matter of skill in the individual, the soldier must be individually trained in machine and similar skills.

It makes the whole subject more intelligible if you bear in mind that the soldier of the present national army not only learns the tricks and business of the Signal Corps, the Artillery, the Air Corps, the Chemical Corps, and all the rest of the various arms of the Services, but he fundamentally must know something of the basic skills of machines that are used for transport, for shooting, for transmitting messages and for keeping the many machines of transport, communication and fighting in action in an emergency. It is for this reason that all men of all branches, infantry, cavalry, artillery, medical corps, air corps, are not trained to cook or to cobble or to do the comparatively

(Please turn to Page Thirty-eight)

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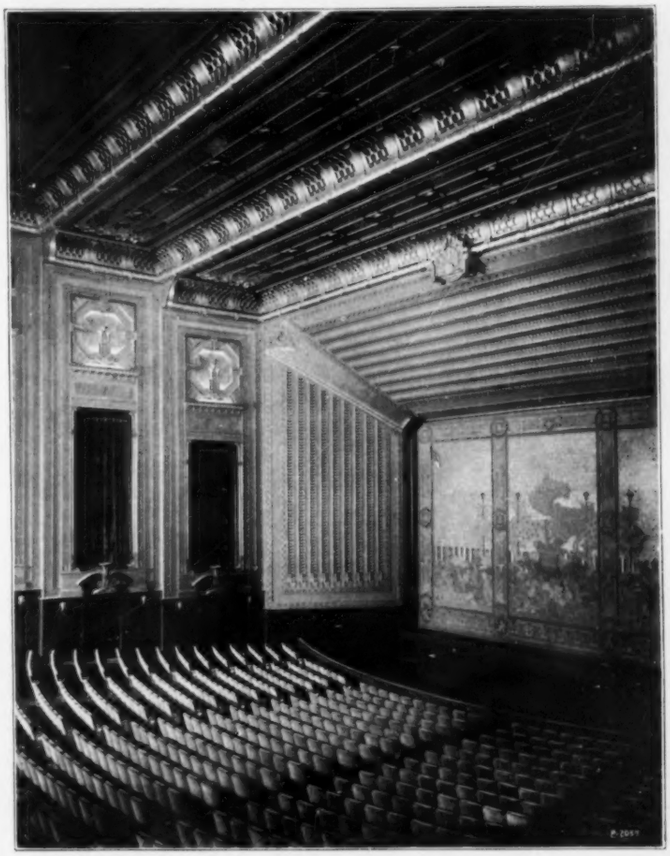

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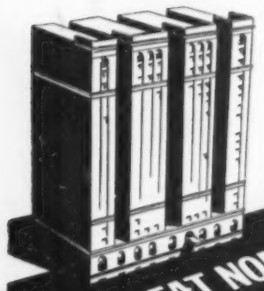

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WASHINGTON NEWSREEL

(Continued from Page Thirty-six)

menial jobs of an earlier day, but are taught to do some of the skilled things that must be done to the equipment which is more or less intricately made of machinery. It is obvious every man in this man's army learns something about mechanical skills. They have schools all over the place, and they are taught by every expert available. General Staff officers hold that the film, the training film, is the best corollary adjunct to be had to make them better trained and to train them swiftly.

Officers put it this way. Virtually every man in this present Army of 1,600,000 men must be trained in some degree. This means thousands of classrooms in hundreds of places all over the United States and its appendages. It is impossible to secure top flight experts in the skills to teach in every classroom. But it is perfectly possible for the less top flight teachers to use training films, made by the greatest experts in the country, to teach the mechanical and other skills that the less expert cannot actually demonstrate themselves. The Army—and the Navy—therefore make tremendous use of such films, as swiftly as they can obtain the films.

To the Army and Navy the production of the Office of Education films is the answer to many a prayer, because they can get splendid film technique, the finest teaching skill, and the last word in professional and technical abilities, as well as demonstration by the best mechanical devices, and they can get mass production of such films, for distribution to outlying bases and places where there are limited facilities.

This naturally leads to the thought about projectors. The greatest immediate and potential markets for projectors among Government agencies, undoubtedly are the Army and the Navy. What the Army thinks about the matter virtually reflects the thought of the Navy. The General Staff officers of the Army hold that 16mm. projectors must be used in the class rooms. They feel the 16mm. is lighter, more portable, requires less power, and therefore can be used in places where the power necessary for the heavier projectors would not be available. Army people feel the 16mm. must be made useful for all agencies of Government, so there may be some approach to standardization and interchangeability.

—ARNOLD KRUCKMAN

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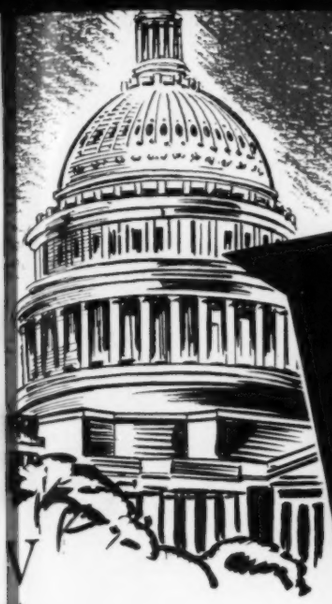

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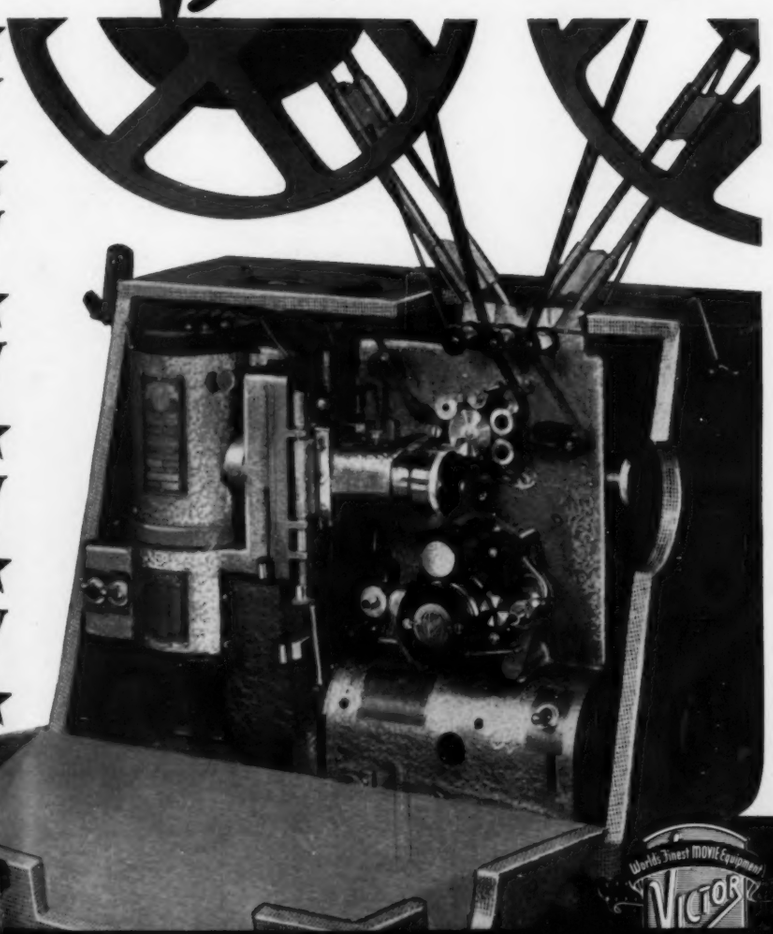

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